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John H. Browne.
from John Ellis.
Norwich. 1856

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SELECT DESIGNS

FOR

PUBLIC BUILDINGS;

CONSISTING OF

PLANS, ELEVATIONS, PERSPECTIVE VIEWS,

SECTIONS, AND DETAILS,

OF

CHURCHES, CHAPELS, SCHOOLS, ALMS-HOUSES,

GAS-WORKS, MARKETS,

AND OTHER BUILDINGS ERECTED FOR PUBLIC PURPOSES.

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LONDON:

THOMAS KELLY, PATERNOSTER ROW,

AND SOLD BY ALL BOOKSELLERS.

MDCCCXLII.

LONDON:
JOHN RIDER, PRINTER,
14, Bartholomew Close.

INTRODUCTION.

If there existed among the records of ancient literature and art, a single set of Designs for Public Buildings, it would better illustrate the state of society among the once glorious, but now extinct nations, than all that poets and historians have written. Unfortunately, however, the art of printing was unknown to the ancient Greeks and Romans, and the noble structures which they raised for all time, as they fondly imagined, have fallen to dust or ruin, with the solitary exception of a few temples and triumphal arches. Natural causes and the ruthless hand of the despoiler have joined in the work of destruction, and the noblest efforts of ingenuity and art,—the pride of man in his highest stage of civilization,—have disappeared, leaving no record of their own beauty, and barely a notice of their former existence.

But when we thus reflect upon the destruction of ancient architecture, and mourn over the loss of so many noble specimens of art, we are apt to forget that, with them, we lose in a great measure the knowledge of the public social habits and characters of the nations who erected them. It is true that from the brief and incidental notices to be found in the pages of history, we may gather some information, but far more valuable would be an accurate copy of the drawings from which one of each of the several classes of public buildings was erected.

This consideration gives more than a passing interest to this volume, and invests it with the character of a national undertaking.

If, however, this work had no other claim upon the attention of the present age, it would in all probability want that public support which we are willing to believe it will receive. Just in proportion to the intellectual strength and cultivation of the human mind, is the desire to perpetuate the remembrance of its existence. The same is true of nations; but although there is diffused through society a desire to establish a character to be honoured and admired by posterity, and not less to leave a record which shall make an irresistible appeal and secure a posthumous fame; it is rather sought in the bold and striking objects of architectural design executed in enduring masonry, as it is generally supposed to be, than in designs perpetuated by the art of the engraver. The past history of mankind, however, plainly declares, that the one mode is utterly insufficient for the purpose, and that few and frail as were the records of the pen, they have outlived the numerous efforts to obtain immortality by works executed in apparently more durable materials.

In every country which is advancing in civilization, the wants of the people are daily increasing, new discoveries are made, and new buildings are required. The higher the social state, the more men are thrown together, and instead of acting individually they begin to act in concert, and the benefit of a number is sought in the contributions of individuals. Large public buildings thus become necessary, and the architect is called upon to meet the wishes and wants of the community. The club-houses, libraries, and philosophical institutions of the present day, are instances of the effects of combination.

These Select Designs for Public Buildings, therefore, have a present interest to all who are engaged in the art of building, and in scarcely a less degree will attract the attention of other classes of men in European countries and settlements, where modern improvements and discoveries have been adopted. As such, it is presented to the reader, with a full conviction that the public will give it that degree of encouragement and support of which it may be found worthy.

A DESIGN FOR NATIONAL SCHOOLS.

The importance of education to all classes of society, to man in every rank and whatever may be his employment, was so little understood in this country a few years since, that the majority of the people were profoundly ignorant of all subjects not immediately connected with the trades or arts by which they obtained subsistence, or accumulated wealth; and they were consequently either governed in their opinions by prejudice, or thoughtlessly yielded themselves to the control of any better informed person who might attempt to obtain the direction of their minds. With this ignorance, the unhappy men were so satisfied, that every attempt to communicate knowledge either to themselves or their children, was received with suspicion, or rejected with contempt. All the vices of the human heart, but especially cruelty, are the offspring of ignorance; and hence it was that in those days, the very sports of the people were characterised by a disregard of the lives and comforts of others.

If it were necessary to prove the indissoluble connexion between ignorance, cruelty, and vice, we might appeal to the mental condition of the Romans in the brightest periods of their history, and compare it with that of the Athenians when surrounded by the noblest productions of the arts, and luxuriating under the influence of the diversified knowledge diffused among them, with the full appreciation of the most excellent efforts of the human mind.

The history of Rome fully attests that even in its brightest period, when its poets, orators, and philosophers had raised it far above all comparison in literature as well as in arms, the middle and lower classes, which formed the bulk of the inhabitants, with the soldiers, were grossly ignorant, and indulged themselves with amusements which appealed to the lowest passions of the human mind. Pugilistic combats, encounters with beasts, and spectacles of blood, attracted the entire population of Rome to the amphitheatre. Nor will it be forgotten by some of our readers that within the last fifty years the same cruel amusements were indulged in England, and even denominated national sports. Education, however, is inimical to cruelty; and as the mind and morals of the people have advanced, these exhibitions have ceased to attract, until at last they have fallen under the public condemnation, and are repressed by the authority of the law.

We shrink from an examination of human nature in the state of low degradation to which it may be reduced from a destitution of culture, but the task would probably be found useful although humiliating. To what cause are we to attribute the barbarity and savage cruelty of the inhabitants of many portions of our globe? Without doubt, to the want of education. It is ignorance that gives liberty to the exercise of all the malignant passions of the human mind, and represses the activity of the nobler powers.

The nineteenth century introduced a new era in the history of Europe, for it was the one in which the importance of education as a national object was admitted; and although not yet practically adopted in all countries to the extent that is required, its value is fully acknowledged. The circulation of cheap books has been one means of advancing the education of the people, and especially of that class of books which have led industrious and intelligent working men to consider the principles upon which their various employments are founded.

The man who in the exercise of his calling blindly follows the practice of others, is intellectually but little better, and practically less useful, than a machine. Man is noble in the exercise of his physical powers, but he is most noble when he controls inanimate agents, and compels them to perform his purposes. It is, indeed, as an intellectual being that he rises above all other created existence; but if the mind, the centre of his power, be left uncultivated, the soil which would produce the fruits of virtue, will give life and luxuriant growth to the weeds of immorality and vice. Cultivation, then, or in other words, a suitable education, enables a man to exercise his calling as an intellectual being, while habits of thought prevent him from becoming a servile imitator or a laborious drudge.

To insure the education of the people, it is necessary to provide for the instruction of the young. Institutions and societies, which throw a glory over the country, have been provided for these purposes by the state and through the active exertions of philanthropic men.

The National Schools of this country were founded upon the system of education proposed by Dr. Bell and Mr. Lancaster. These schools are now established in almost every parish in England, and great have been the benefits derived by the children of the poor. Thousands have received in them the elements of education; and by the operation of the virtuous principles there inculcated, have been made useful and valuable members of society. Their establishment was a great national boon, and the benefits which flow

from them will give a healthy energy to society, increasing with years. Still it is to be wished that these excellent institutions could be enlarged, and a system of education be adapted to the entire population of the labouring classes.

The British and Foreign School Society is also a valuable auxiliary in the education of the children of the poor. It maintains many extensive day schools, which are conducted upon a system adopted by the Society, and found to be well calculated for the instruction of the pupils. More than fifty thousand children have been received into these schools since the establishment of the Society, and at the present time there are about one hundred and fifty schools, containing about twenty-one thousand scholars, under the inspection of the Central Committee. In addition to these, there are schools for the education and training of those young persons who intend to become teachers.

We might refer to many other similar charitable institutions established for the benefit of the children of the poor, and for those who labour under some bodily infirmities. It is, however, for the important establishments just named, that the architect will be most frequently called to exercise his art.

One or two practical remarks may be made for the guidance of those who may have occasion to design for a national or any other free school. This appears an exceedingly simple task,—an opinion to which we may probably trace the frequent failure of architects in their attempts to erect suitable structures. A school-house should have little, if any, exterior decoration—architectural ornament is out of place; and the person who designs must seek to please by simplicity of arrangement, light and shade, and proportion. When we see a highly decorated and florid school-house, we cannot suppress the thought that it is not only discreditable to the judgment of the architect, but disgraceful to those unwise stewards, who thus distribute the funds of private or public charity, and in fact lose sight of the immediate purpose for which the edifice was erected.

With regard to the interior arrangements, there are but few considerations which require notice, but they are indispensable. A good system of ventilation is necessary for the health and comfort of the children: the manner in which this can be obtained we have shown in a detail drawing. An entire separation of the boys and girls, and such an arrangement of the apartments of the master and mistress as will enable them to have an adequate general superintendence, are the other principal considerations.

Plate I.

This is a perspective view of a design for national schools, with separate apartments for the master and mistress. Simplicity is the main feature of this design, and when it is considered that the building is intended for a charitable purpose, the propriety of excluding all ornament will be apparent. We have, however, endeavoured by an attention to proportion, to secure an effect which may be pleasing, without conveying to the observer a false impression of the object of the building.

Plate II.

Fig. 1 is a plan of half the ground floor, showing the boys' school or class room, and the method of fitting it up; to which is added the ground floor of the master's residence.

Fig. 2 is a plan of the first floor on the mistress' side of the house, and the roof of the girls' school-room.

Plate III. Details.

Fig. 1 is a section of a wrought metal roof, with a suitable ventilator, which may either be glazed and suspended on pivots so as to open by cords in the usual manner; or the metal sash may be filled in wire gauze, which would be found a more efficient mode of ventilation.

Fig. 2 is a plan of part of the ventilation to the same scale.

Fig. 3 is a plan of part of the same, to a larger scale.

Fig. 4 is a section of the head of the ventilator.

Fig. 5 is the sill of the same.

Fig. 6 is the external elevation of the ventilator.

Fig. 7 is a section of part of the roof, and the internal elevation of the ventilator.

Fig. 8 shows the foot and shoe of one of the principal rafters, the tension rod, and other parts of the roof.

Fig. 9 is a section of the same.

Fig. 10 is a section of the king-bolt.

DESIGN FOR A PHILOSOPHICAL INSTITUTION.

The establishment of philosophical institutions in all the principal provincial towns of this country, has been the most important of all the means which have been adopted to disseminate useful knowledge, and create a desire for intellectual improvement. They may be said to have had their origin in a spirit of emulation; for such were the effects produced by the establishment of similar institutions for mechanics, that the middle classes, who have long felt an intellectual superiority over the higher, and have possessed a wider range of useful information, fearing that they would be surpassed in knowledge by the labourer and the artisan, found it necessary to obtain for themselves and their children a more ready and efficacious means of useful instruction. The system which had been so successful among the mechanics was thought to be the most available, and new and elegant structures were therefore raised in one town after another; and such has been their success, that the knowledge which would a few years since have placed its possessor above nearly all his friends and neighbours, is now scarcely sufficient to pass him through society with credit. The importance of this system of public instruction has been fully developed, and the mode in which it should be carried out, so that it is the duty of the architect to provide every convenience that can be desired. In our design we have endeavoured to show how the necessary arrangements may be made, and we shall now proceed to give some particulars, which may still further assist the architect in the preparation of his designs.

In a philosophical institution one of the principal apartments must be a theatre or lecture room, suitable for the delivery and hearing of a discourse. It has been proved that no mode of communicating knowledge is so effective as that of public lectures. There is a charm in the human voice, and when this is aided by suitable intonation and gesture, all is done for the assistance of the learner that art can afford. With a full conviction of this, the directors of philosophical institutions are especially careful to provide a suitable lecture room. In designing such an apartment, the architect must bear in mind that the lecturer and the table before which he stands, must be seen from every part of the theatre. To effect this indispensable object, the seats should be raised one above the other, and with a sufficient pitch to enable every person to see over the head of the individual who is sitting before him.

The horse-shoe form is therefore preferred, and the lecturer's table being placed at a lower level than any of the seats, every one commands a complete view, and can distinctly see whatever may be placed upon it, to illustrate the subject of discourse. In connexion with the form and arrangement of the seats and the rostrum, the architect must study the disposition of the lights, for upon this, not less than other particulars, the exhibition of things or experiments must depend.

With a suitable attention to these particulars, the comfort of the audience will be secured, but it is not less important to provide for the lecturer. The subjects most frequently brought before the attention of an audience in a philosophical institution, are those connected with natural philosophy and chemistry, which require illustration by experiment. Apartments suitable for the preparation and performance of these experiments, previous to their being brought before an audience, must therefore be provided. A laboratory is the first thing to be studied. This should be fitted with a furnace and sand-bath, and provided with an adequate supply of pure fresh water. In this, more than perhaps any other apartment, a good system of ventilation is indispensable, for in chemical investigations, and in the preparation of experiments, noxious vapours are often set free, and would, if not rapidly carried away by a good circulation of air, be exceedingly detrimental to the manipulator. The laboratory should be near the lecture-room, and yet so entirely separated from it that an audience cannot be, under any circumstances, annoyed by the unpleasant or unwholesome atmosphere with which it is frequently filled, or be startled with the detonations or trivial accidents which are so common to the chemical student.

An instrument room is scarcely less necessary than a laboratory. It is used as a store for various philosophical apparatus, and should be so far from the laboratory that the metal-work used in construction, either as necessary or for decoration, may not be injured by the vapours already spoken of, as being frequently present in all places of chemical research. As the instruments are all supposed to be necessary for lectures, this room should be as near to the theatre as possible, so that they may be carried from one to the other without the fear of injury, a sufficient degree of care being exercised by the attendant. A lecturer's room should also be provided adjoining the stage. This will not only be found convenient as a retiring room, but instruments and other things required for experiment or exhibition, may be placed in it, before a lecture is commenced, and be

brought to the operator as they are required. This is in some instances peculiarly necessary, and especially for electrical apparatus, which becomes unfit for the exhibition of experiments when exposed to the vapour of the atmosphere in a crowded room.

These are the principal arrangements required for the lecture department in a philosophical institution, and of the others it is not necessary to make any extended remarks. A museum for the preservation and exhibition of specimens of natural history, minerals, and fossils, is generally thought necessary. This room should be lighted by a sky-light, as a more equal and diffused light is thus secured; and the walls are left free to receive a continued series of glass cases. A news-room, and library, should be placed in the front of the building, and be made as cheerful as possible. In many of the most successful philosophical institutions of this country, the establishment of classes for mutual instruction, or under the superintendence of a competent master, has been found extremely beneficial, and rooms should therefore be provided for this purpose. That which is employed for the scientific classes, should be lighted by a sky-light, and a means should be provided for darkening the room with a shutter, easily moved, for the performance of experiments which can only be made effective when the light, in greater or small proportions, is excluded; and the same remark applies to the theatre. The architect will be easily able to provide suitable accommodation for the resident librarian or keeper, according to the rank of the institution, and his station in society.

Plate IV.

Is the perspective view of a design for a philosophical institution, in the Italian style of architecture.

Plate V.

Fig. 1 is a plan of the ground floor. The general entrance to the building is in the centre of the principal front, and is approached by four steps, which give a suitable elevation to the building. The visitor first enters a plain but convenient hall, which has a porter's room on one side, and a waiting room on the other; and this leads into a broad passage, with a library on the left, and a reading room on the right. At the end of the passage, is the landing of the principal staircase, from which the visitor may ascend to the gallery, or enter the lower or ground floor of the theatre. As

a ready means of approach, is of the greatest importance in all buildings where a number of persons are brought together, a side entrance is provided, which may be opened when the theatre is used. On one side of the lecturer's stage, there is a small room, where apparatus may be placed ready to be brought on the table when required; on the other side is a small lobby with a staircase to the basement.

Fig. 2 is a plan of the first floor. One part of this plan is occupied by the gallery of the theatre, as already explained; and at the opposite end, a gallery for astronomical apparatus is provided, which may also be used for the general purpose of instruction. From this room the observatory is approached by a step-ladder. The remaining part of this floor may be used for the apartments of the secretary and librarian, and a good committee room may also be provided.

It has not been thought necessary to give a plan of the basement, for it must be appropriated according to the particular wants of the institution. Three staircases may be provided, one beneath the principal stairs, one from the front waiting-room, and another from the lobby adjoining the lecturer's stage.

Plate VI. Details.

Fig. 1 is a section of a portion of the roof, showing the foot of the principal rafter, and the method of forming the gutter in the eaves. A. Principal rafter. B. Cast metal shoe to receive the rafter. C. Stone planceer. D. Gutter. E. Metal roll. F. Common rafter. G. Stone modillion. H. Ceiling joist. I. Binder. J. Wall plate. K. Tie beam. L. Bracket for cove. M. Plaster of cove and cornice. N. Cornice. O. Wall.

Fig. 2 is a section of part of the first floor. A. Wall. B. Iron girder. D. Ceiling joist. E. Stone strong course. F. Wall plate. G. Cornice. H. Binder.

Fig. 3 is the elevation of one of the external angles of the building, showing the quoins. B. B. reticulated stone rustic quoins. A. String course. C. Rustics.

Fig. 4. Cornice for observatory. *Fig.* 5. Truss, or modillion for principal cornice. *Fig.* 6. Profile of the same. *Fig.* 7. Embellishment under modillions. *Fig.* 8. Cap of antæ. *Fig.* 9. Embellishment under string course. *Fig.* 10. Mouldings of antæ. *Fig.* 11. Base of antæ. *Fig.* 12. Truss for observatory. *Fig.* 13. Profile of truss for observatory. *Fig.* 14. Ornamental tile for stopping the rolls on the roof. *Fig.* 15. Upper moulding of observatory. *Fig.* 16. Moulding of chimney-tops.

A DESIGN FOR AN EPISCOPAL CHAPEL.

The efforts which are being made in the present day to increase the number of churches, and to provide religious services and instruction for the great mass of the people, have perhaps been more sincere and more successful than any similar efforts at former periods in the history of the Christian church. The religious edifices which have been erected in our own day, in this country, will at some future period in the history of England be considered the evidences of an extraordinary religious zeal, and the age itself will perhaps be distinguished by the historian as having possessed a great degree of interest in the spiritual welfare of the people. For the moral and religious character of the present age, these churches will speak to future times in flattering suggestions, but they will give a different testimony as to the state of the arts among us. The great majority of the churches erected during the last ten years, are distinguished by an utter destitution of architectural taste, meanness of design, a slavish imitation of the outline, and a neglect of the ornaments of former styles. But there will fortunately be found among the works of the age, other buildings of a more decided and more pleasing design, which will perhaps rescue living architects from the sweeping condemnation of some future historian of the arts. It cannot, however, be denied that the churches which have been erected by the Building Commissioners, not less than those which have been undertaken by parishes and individuals, give a most unfavourable opinion of the architectural talent of the nineteenth century. It is now easy to discover a cause for this, but those who may at some future period come to the same conclusion as to the designs, will probably be content with the discovery of some more evident reason, and condemn the architects themselves, as a class of men disgracefully ignorant of the principles of their art. The baldness which marks all the modern churches, the lopping off of all the rich foliage of their several styles, which has left them as cold and withered trunks, may be traced to the economy which has been necessary in distributing inadequate funds. A want of ornament is not a common fault among modern architects, nor indeed among architects of any age, especially during those periods when the arts have been falling from the principles of correct taste. In this respect, therefore, they may be considered as the creatures of circumstance, and be unblameable. But it may, and will be

asked, why styles have been adopted which could not be carried out. Take from the Norman its zigzag, lozenge, billet, and other characteristic mouldings, its open trifolia, and the tablet cornice of the tower, and you leave it a thing without a name, offensive to the eye, and a disgrace to the taste of its designer. Yet such is the Norman of the present day. Other styles have in the same manner been stripped of their decorations for the sake of economy, a fact which can only be accounted for by admitting that there is a want of design, an incapability of adapting old styles, or of inventing those suited to the new state of things.

The object for which churches are erected in this country at the present time, is not that for which the old Gothic churches, which so excite our admiration, were built. The worship of the fifteenth century, and the manner in which it was performed, bear but little resemblance to that of the nineteenth. Pews are of modern invention, and arose with the introduction of preaching as a principal object in all religious worship. At a former period worship was an active service, but preaching is, as far as the hearers are concerned, a passive act, if it can be so called, and requires from the architect an attention to the comfort of the hearers. To give accommodation to as large a number of persons as possible, is therefore always impressed upon the architect as a thing to be mainly considered. By the introduction of pewing, the expense of erecting a church has been increased, and a less sum can be devoted to external and internal decoration, while at the same time convenience is more to be considered than effect. The modern architect has therefore difficulties to contend with unknown to his predecessors, and less opportunity of exercising his talent in design. Thus far we may take upon ourselves the duty of an apologist, but no consideration can justify the distortion of styles, the neglect of proportion, and the want of design, which so much distinguish the productions of modern church builders.

The design we have ventured to present to our readers is in the Roman style, and is intended as an example of the application of classical architecture to the erection of a modern church. The prevailing taste is certainly favourable to the use of Gothic architecture, in the erection of churches, and we are convinced that no style is better suited for that purpose. The associations connected with our own history, are all adapted to raise this beautiful mode of building in our estimation, and it possesses characters essentially suited to religious structures. We have, therefore, adopted it in

some of the designs which will be presented to our readers in subsequent parts of this work. But the classical style is not unsuited to Christian structures, and especially to those erected for the purpose of receiving the worshippers who cannot find suitable accommodation in a parish church. Should it be even admitted that the classical architecture is not so well suited to religious structures as the Gothic, it will not be denied that it is better to adopt it in its purity of proportions and simplicity of detail, than to rob the Gothic of its characteristic ornaments, for the purpose of obtaining a pointed arch, and a rude resemblance of the works of our forefathers in the middle ages.

The architecture of the Greeks and Romans is associated in the minds of all persons, with the pagan rites practised by those nations. The noblest structures ever raised in that style, were dedicated to the false gods, who hid from the perception of the most enlightened nations of antiquity the knowledge of Him by whom all things were made, and in whom all things exist. But still the classical architecture is not unconnected with a purer faith, although in the period of its debasement, when rapidly hastening to its fall. Upon the removal of the seat of government from Rome to Byzantium, and the establishment of Christianity as a national faith, the ancient capital, as well as every other portion of the empire, was spoiled of many of its architectural riches, to provide materials for the construction of Christian churches. We regret that many of the noblest works of an earlier age should have been thus robbed of their ornament, — despoiled and destroyed by the hand of fanaticism, — but it must not be forgotten that the early Christians worshipped in churches built after the manner of the Greeks and Romans, and even with the materials which they had prepared. A modern church in the classical style, is not therefore destitute of pleasing associations in the mind of the man who considers it only in reference to its sacred uses.

Plate VII.

This is the perspective view of a design for an episcopal chapel, in the Roman Ionic style, which, from the elegance of its outline and the simplicity of its details, is well adapted for such a building. The chapel will hold conveniently about one thousand persons. It may easily be extended or diminished if thought necessary; but should any builder attempt to do this

for the purpose of adapting it to the use of a particular congregation, he must be careful to retain the relative proportion of the parts, for if these be changed, a want of harmony will be immediately observable, which will render the design grotesque and ridiculous. The chapel may be built either with or without galleries; but even if it should be thought desirable at the time of erecting the building to omit galleries, they should be provided for, so that they may be added without difficulty when required.

The construction of such a design as that we have here presented to our readers, is so simple, that any person who is acquainted with the ordinary principles of building, will have no difficulty in executing it. The best mode, in most situations, will be to build the walls of good hard bricks, facing them with grey stocks, of an uniform colour. The principal cornice, frieze, pilasters, and other decorations, should, if possible, be formed of stone; but when the architect or builder is limited by funds, he must resort to the use of Roman or some other cement.

Plate VIII.

This is a part of the ground plan, and shows the stairs to the galleries, should they be introduced; the arrangement of the pews, the altar, vestry, and robing-room.

Plate IX.

This plate unites the advantages of a transverse section and a perspective view of the interior, looking towards the altar. The roof, as will be seen, is one of easy construction, consisting of a queen post truss, bound by iron ties in the usual manner. The church should be paved throughout with stone, excepting only the pews, vestry, and robing-room. In the construction of the coved ceiling, the experienced builder will find no difficulty.

DESIGN FOR A RAILWAY STATION.

Plates 10, 11, 12, 13, 14, and 15.

Of all the mechanical contrivances which have in our own day aided the progress of society, none are of greater importance than the establishment of railways, and the introduction upon them of steam as a motive power. For the last ten years, engineers and architects have expended their talents in the improvement of these new lines of road, and so extensive have been the works, that nearly all the most important commercial and manufacturing towns, are thus united with the metropolis and with each other. The effects of this diversion of the traffic from the old roads, and a rapid transit, are not yet fully felt, but it is already evident that the commerce of the country has been facilitated, and the intelligence and information of the people promoted. It would be a useless task to attempt a statement of all the advantages which are expected to flow from the formation of railways; but they may be comprised in the one result, that men are brought nearer to each other, and by mutual co-operation advance the general good. It has always been found injurious to a state, that its population should be scattered over a wide district; for, the more distant individuals are from each other, the more dependent are they upon their own productions for the comforts of life; and the less rapid will be the progress of civilization. Distance, however, that is, the mere question of space, loses all its importance in a political sense, when it ceases to separate men by lengthened periods of time, and may even become positively beneficial to society, by giving greater opportunities of discovering and using those advantages of nature which are spread over the earth, and not concentrated upon any particular spot; as though a provision had been made for the distribution of the human race, and a motive held out for the continued dependence of every individual, upon the industry and thought of all. But we shall not attempt to enlarge upon this subject, seducing as it is to those who take an extensive view of the present relations and future destinies of the several sections of the human race, and the means by which the necessary comforts and desirable luxuries so richly provided by nature are made available to man, in what country soever he may live. It must be admitted by all persons, that the railway is a means of bringing the distinct families of men, and the individuals of each family, nearer to each

other, and by communication to dispel prejudice, create respect and brotherly feeling, and thus to promote the cause of morality, religion, and truth. With such an object in view, the resources of science cannot be foolishly expended, and to diffuse the information must be a desirable if not a meritorious employment.

Railways had been formed in connexion with the coal mines, many years previous to their introduction for public traffic. The first attempt to make a line of iron railroad was commenced between Liverpool and Manchester; but when that line was opened in the year 1830, and locomotive engines, for trial, were placed upon it, the engineers had no conception of the power of the machines they had manufactured, nor of the ultimate extensive application of them. A new era, in the commercial character of the country, was opened; but its dawn was unperceived by those who were most watchful and most anxious for the advent of a new system of intercourse, consistent with the advance of the human mind. For a long period of time, the Liverpool and Manchester railroad remained a solitary instance of what could be attained by an indomitable spirit, guided by just principles of science; and had no further effort been made, to facilitate the communication between distant parts of this kingdom, the establishment of one railway, however advantageous to a section of the country, would have been, to the nation at large, comparatively useless.

The adoption of railways in this country, may therefore be said to have commenced in May, 1833, with the Act of Parliament obtained for the construction of the London and Birmingham line. The works for this great national undertaking were in progress in the following June; and in July, 1837, twenty-four miles from the London terminus were opened to the public. The country, from almost one end to the other, is hilly, or at least undulating, so that the cuttings and embankments are considerable. It has been stated, that 16,000,000 cubic yards of earth were removed in the necessary cuttings, and of this nine-tenths were again employed in forming the embankments. The width of the embankments, at the top, is thirty-three feet, and the cuttings are the same at the bottom. The slopes on the sides of the embankments, vary from three to one in height, to two to one, and the greatest slope of the excavation is three to one in height, and the least three-quarters to one. The width between the rails, forming each line of way, for there are two, upon one of which the carriages run to, and upon the other from, Birmingham, is five feet, and a space of six feet is left

between the lines. Two kinds of rails were used, the fish-bellied, or that which is of an unequal depth, being greatest in the centre of each length, and the parallel. The former were fifty pounds weight to the yard, the latter in some parts of the line sixty-five, and in others seventy-five pounds. The chairs, upon which the rails are supported, are placed at a distance varying from three to four feet, and the rails are wedged to them with oak keys. The chairs are fixed to blocks of stone, such as granite, Portland, and Bramley Fall; or to sleepers of oak and larch, the former being used in the excavations, and on small embankments, the latter on the large embankments. The stone blocks are two feet square, and generally one foot deep. They are placed diagonally to the rails, and the chairs are attached to them by spikes. The same plan is adopted with the sleepers, but as an iron pin cannot be driven into the stones, they must be first drilled and plugged with wood. These plugs or trenails, are six inches long, and holes are bored in them to receive the spikes. The ballast, which forms the foundation, is two feet in thickness, being ten inches beneath the stone blocks, and eighteen inches beneath the sleepers.

In the construction of the Great Western Railway, a new system was adopted, which for a time was the subject of much discussion. So strongly, indeed, was Mr. Brunel, the engineer, opposed by some of the proprietors, that other professional men were selected to report upon the propriety of his plans. From the report of Mr. Wood, the author of a valuable work on railway practice, we may extract a passage, which fully states the difference between the construction of the Great Western and other lines of railway.

"The increase of gauge has been from four feet eight and a half inches, to seven feet, and the prominent reasons assigned for such a departure from the common width, is the attainment of a higher rate of speed — increased lateral steadiness to the carriages and engines — a diminution of the friction by the use of wheels of a large diameter — and a greater space afforded for the works of the locomotive engines.

"The deviation from the ordinary mode of constructing the railway, has been the substitution of continuous longitudinal timbers, with piling at certain intervals, and cross transomes, with iron rails, of a particular form, screwed down upon the longitudinal timbers.

"The additional width of gauge has increased the breadth of the entire track of the railway, between the outside of the rails of the two lines (including the breadth of the rails) from sixteen feet three inches, to twenty

feet ten inches; consequently all the works connected with the formation of the road will be increased to a certain extent, but not in proportion to the above figures. The plan of continuous wooden timbers and piling also, involves an additional cost beyond that of forming railways according to the ordinary method.

The reader would be interested by, and derive advantage from, a careful perusal of Mr. Wood's report, which, although incorrect in some particulars, is highly creditable to him as an impartial and scientific production, and forms a strong contrast with the report of Mr. Hawkshaw.

The various works which are required in the construction of a well-appointed railway, may be classed under four general heads, each part of the work being undertaken by different persons, although the whole is ostensibly under the control of an individual who is called the engineer. The first thing to be done, when a railway is to be constructed, is, to obtain an accurate representation of the country, and this is effected by taking first a horizontal, and then a vertical survey — the former process is called surveying, the latter levelling. The engineer determines upon the direction in which the railway is to be carried, and the survey is necessary to fix with certainty the property required; and the levels and survey for the preparation of those plans and drawings necessary for the construction of the subsequent works. The excavations and embankments, by which a level and horizontal road is to be formed, are next undertaken. The road being raised to the height required, the rails are laid; but while this is being done, the various bridges, arches, and buildings, are constructed; and this is the fourth division of the work.

These works, in connexion with the formation of the engines and carriages, comprehend every variety of what is in the present day called engineering practice. Why a distinction has been made between the professions of architecture and civil engineering we are utterly at a loss to imagine, but we are certain that the separation of the two professions, as they now exist, was not only uncalled for, but is founded upon the presumptuous assumption of superior knowledge on the part of the engineers. If engineering were confined to the invention and construction of machinery, there would be a propriety in the separation of the profession from architecture; but now that the engineer arrogates the possession of a sort of patent right to all works requiring scientific information, we deny the propriety of that separation of the professions in which it originated. If an engineer were to define the

boundaries of architecture and civil-engineering, he would say that the former embraced all that related to the decoration of structures, and the latter all works in which mathematical and scientific skill are required; and thus he assumes that an engineer ought to be employed for the construction of bridges, docks, and railways. The two former, however, have been executed by the architect ages before the profession of engineering had an existence; and he is now as capable of executing them as those who have of late years had the direction of such works in this country. With these opinions, we have introduced our design for a railway station, and the details by which it is illustrated.

Dr. Lardner has given the following description of the formation of a railway.

"All the great lines of railway which have been formed, or are in progress, not only through this kingdom but on the continent of Europe, are constructed, with very trivial variations, upon one uniform principle. After the ground has been levelled, and the bottoming properly prepared, stone blocks, measuring eighteen inches to two feet square, and twelve inches deep, are placed at intervals, varying from three to five feet from centre to centre, according to the weight and strength of the rails intended to be used. On the centre of the upper surface of the block is placed a cast iron chair, having a cushion of prepared felt between it and the stone block, and pinned down to the block by iron pins driven into wooden pegs, previously inserted in holes driven into the stone. These chairs are the props which from point to point support the rails, the stone block being the foundation of the chair. The rail is manufactured by the process of rolling in lengths regulated by the distance between the chairs. Thus, if the chairs be three feet apart, the rails are manufactured in lengths of fifteen feet, five chairs supporting each rail. If the chairs be five feet apart, then the rails of the same length are supported by three chairs. The stone blocks are placed upon a firm bed of broken stone, or other well consolidated matter, so that as little yielding as possible shall take place between them, and that the rails shall maintain their position with the utmost practical truth and accuracy. In those parts of a line where a valley in low ground is crossed by an artificial mound raised upon it, the earth of which the mound is formed requires a considerable time to become consolidated. The use of these massive stone blocks would be attended with many difficulties and much inconvenience on such parts of the railway; therefore, it has been customary to substitute temporary

supports for the rails, by laying across the road rough beams of wood, usually formed of large timber, split through the middle, the flat side being placed downward, at the same intervals as those at which stone blocks on other parts of the line are used. To this timber the chairs which support the rails are pinned."

In order to render our design for a railway station as useful as possible to our readers, we have given two designs for arches, in one of which the railway is supposed to pass over, and in the other under it. The skill required in the construction of a railway, is chiefly in the erection of the various archways and bridges. Many of them are of extremely simple construction, but great difficulties at other times present themselves; and to overcome them, all the ingenuity and knowledge of the engineer must be brought into action.

The number of railways which have been constructed in this country, have been the means of presenting to professional men all the imaginable varieties of form and condition, so that the experience which has been acquired is sufficient to meet the difficulties which are likely to arise in any future undertakings. General rules have also been formed, which will guide the architect or engineer under ordinary circumstances.

"The average dimensions of bridges over which the railway passes, and placed at right angles to the rails, should be as follows: the breadth of the abutments may be thirty feet four inches, so as to allow twenty-eight clear feet for the width of the railway, deducting the two fourteen-inch parapet walls. Should there be a plinth to those walls, the extreme breadth will be increased to thirty feet eight inches. The batten, incline, or slope, of the wing walls is in ordinary cases two inches in the foot, and water wing walls three inches in the foot.

"The following is the average dimension of bridges under which a railway passes. The height from the bottom of the cutting to the level of the springing may be nine feet; the thickness of the ballast upon which the sleepers, blocks, and rails, are laid, two feet four inches; the height from the springing to the soffit of the arch, ten feet; the parapet walls, fourteen inches in thickness; the string-courses, or imposts, if stone, nine inches deep, and two inches in projection. The stone coping for parapet walls is usually six inches in thickness, projects two inches, and is eighteen inches in width. One inch and a half is usually allowed for all chamfers, projections, and plinths, except the parapet walls, which may have a projection of two

inches. The arch should be thirty feet between the piers or abutments, to admit of two lines of rails. All dimensions relating to the arch should be taken on the square, the thickness of which is five courses, or one foot ten inches and a half. The impost may be twelve inches in depth, and project two inches."

Plate X.

Is a perspective view of a design for a railway terminus, or station, for a large town.

Plate XI.

Is the ground plan. In the front of the building there is a small colonnade. The entrance to the offices is in the centre of the building, and on the left-hand side there is a waiting room, and on the right an office for the secretary. The whole of the other part of the central building is appropriated as a pay office, and on each side convenient rooms are provided for ladies, the directors, clerks, and servants, with staircases to the rooms on the first floor, which would make a convenient residence for the manager or secretary. On each side of the desk, in the pay office, there is a door leading to a covered space, where passengers are protected from the weather, both on coming in, and going out.

Plate XII.

Is a transverse section of the covered space of the terminus, over the rails and passages, looking towards the building. The windows at the back of the pay office are here shown, and to obtain a sufficient light a considerable part of the metal roof must be glazed, as exhibited on the ground plan, as well as on this section. The effect of a roof of this description is very striking, when well executed.

Plate XIII. Details.

The details in this plate, are intended to exhibit the construction of the roofs,—that over the covered space, and that over the main building.

Fig. 1 is a section of the abutment of one of the metal rafters, with a cast metal shoe, which is let into a stone wall-plate, bedded upon the wall.

These shoes are connected together by the tension rod, the clips of which, having a small screw or wedge, will at all times allow of the expansion and contraction of the metal, which, although but small, in such a length should not be neglected.

Fig. 2 shows the abutment of the rafters over the hollow iron columns, and the section of the gutters and bearers.

Fig. 3 shows the clip of one of the upright rods.

Fig. 4. is the top of the same.

Fig. 5. is the top of the principal king-bolt.

Fig. 6. is the bottom of the same, with the strutt and tension rods combined.

Fig. 7. shows the method of framing and fixing the roof over the principal building. Instead of the tension rod we have here introduced a wooden tie-beam, as it offers a better means of supporting the ceiling joists, and is more economical for buildings of this description, than an iron truss. In the section we have introduced a new method of framing a gutter for roofs of this description.

Fig. 8 is a longitudinal section of a part of the roof, and will be readily understood by those who are accustomed to working drawings.

Plate XIV.

Fig. 1 is the elevation of a bridge built of brick, over which the railway is supposed to run.

Fig. 2 is the transverse section of a portion of the same.

Fig. 3 is a section of the wing-wall.

Fig. 4 is a portion of the same, the reverse way.

Fig. 5 is a half plan of the foundations.

Plate XV.

Fig. 1 is the half elevation of a bridge faced with stone, under which the railway passes.

Fig. 2 is the half section of the same.

Fig. 3 is a section of part of the bridge, the reverse way.

Fig. 4 represents the foundations of the same.

A DESIGN FOR ALMS-HOUSES.

Plates 16, 17, and 18.

The giving of alms is so strongly enforced in Holy Scripture, that the duty has been made essential in almost all religious creeds; for the inspired volume has furnished all that is "lovely and of good report" in the faiths of other times and other nations. Mohammed, especially, enjoins the cultivation of alms-giving upon his followers, and among them there have been exhibitions of the virtue, which are well worthy of imitation. Christians, however, have not been slow to confess the importance of this exhibition of charity, and the writers upon Christian morals often recommend it as one of the most binding duties in their religious code. "The poor beggar," says Swift, "hath a just demand of an alms from the rich man, who is guilty of fraud, injustice, and oppression, if he does not afford relief according to his ability."

In the early ages of the church, alms-giving was practised to a much greater extent than in the present day. The alms of the devout were formerly divided into four portions: one part was given to the bishops, another to the priests, the third to the deacons and sub-deacons, and the fourth to the poor and the repairing of churches.

Bede says, that even in his day the prelates considered the giving of alms one of their more sacred duties. It was then, and had long before been, the custom, to place an alms-dish upon the table at every meal, into which was carved some good portion of meat out of every dish brought to table, beside the fragments left after the feast, "insomuch as in a hard time, a poor prelate wanting victuals, hath caused his alms-dish, being silver, to be divided amongst the poor, therewith to shift as they could till God should send him better store." It is recorded of Robert Winchelsea, who was archbishop of Canterbury, about the year 1093, that it was his custom to give on every Friday and Sunday a loaf of bread to every beggar that came to his gate, beside his daily distribution of fragments and the contents of his alms-dish; and that in a time of scarcity, he did this to four or five thousand persons, beside daily supplying the wants and necessities of the sick, to whom he gave suitable drinks and clothing, as well as food.

Ethelwald sold in a time of famine, about the year 963, in the reign of

Edgar, all the sacred vessels of the church, to feed the starving poor; and the same was done in the year 1245, by the bishop of Norwich. From these and numerous other instances of the kind, which might be easily adduced, it will be evident that for some time after the establishment of Christianity in this country, the clergy considered the poor to be especially under their protection, and that it was their duty to provide for their comfortable sustenance, as well as to administer to their spiritual wants. In other countries the same practices were followed, and the poor became dependent on the bounty of the church.

On especial occasions, kings were accustomed to give largely to the poor, and the nobles not only feasted their retainers at their tables, but distributed food to the indigent at their gates. The wealthy citizens of London have always been conspicuous for their charity, and large quantities of food and other necessaries of life have been from time to time distributed, especially after their sumptuous public entertainments. It appears, however, from the records of the city, that the expenses incurred by the mayor and sheriffs in their feasts, at last required the restraint of the common council, and an act was passed in the reign of Mary to retrench them. According to this act, no mayor or sheriff was permitted to have on his table, at dinner or supper, more than one course, and not on any occasion to exceed seven dishes. This regulation does not, however, seem to have long restrained the city authorities, nor did it for a moment interfere with their princely charity.

That the day for this indiscriminate alms-giving has passed, need not be regretted. It was suited to the age in which it had existence, one of dependence and servitude. The resources of the country were not then developed, the advantages of independent industry were unknown, and ignorance reigned with an undisputed power over the public mind. The love of liberty, and efforts to obtain it, created a desire for knowledge, and gradually destroyed the system of servitude, which gave birth to indiscriminate alms-giving. The first result of this was the establishment of alms-houses, which was a great improvement upon former customs, for the objects of charity were those who from age or disease were incapable of that honest independent exertion upon which all men should trust for support. In the large cities of this country, alms-houses were erected by wealthy companies or individuals, and especially in London. It would be easy to trace the origin of the various alms-houses connected with the city guilds, but it will be sufficient to adduce one as an example of the whole, and we shall select

that established by Whittington, whose good fortune, wealth, and benevolence, are even in the present day better known than perhaps any of those worthies who are the proudest boast of the metropolis.

The alms-houses constituted only a small part of the foundation established by Whittington. He founded, in fact, a college in Vintry Ward, with provision for a master, four fellows, masters of arts, clerks, conducts, chorists, &c., and to this was joined "a house of alms for twelve poor folks, successively for evermore to dwell, and to be sustained in the same house, which house is situated and edified upon a certain soil that we bought therefore, late in the parish of St. Michael." In addition to these twelve persons, accommodation and provision was to be provided for another, to be called the tutor. The lord mayor was made the overseer, and the craft of Mercers the conservators for all times. The license for this foundation was granted by Henry the Fourth, in the eleventh year of his reign, and in the following year the mayor and commonalty granted a piece of ground to build the college, which was confirmed by Henry the Sixth, in the third year of his reign. The college, however, was suppressed by statute, in the reign of Edward the Sixth, but the alms-houses were permitted to remain. As it is not our intention to give a history of the Whittington alms-houses, it will be sufficient to state that they are still in existence, and that a neat building for the purpose has been recently erected at Highgate.

The provisions to be made for the comfort of the inmates of an alms-house are so evident, that it is almost unnecessary to make any remark with a view to direct those who may have occasion to design such a building. A separate residence, for every family or individual, is generally considered necessary, but the several dwellings are so united as to form but one building. Each of the houses should be provided with all necessary conveniences, and this we consider most important for the comfort of the aged, infirm, or diseased persons, who become pensioners. An ample area for exercise and air, and a good ventilation in the dwellings, are also to be regarded. A chapel is frequently required, and this gives the architect an opportunity to improve his design, by a bold and appropriate central structure. Should it be the intention to afford accommodation for religious worship to a certain number of the public in the alms-house chapel, it will be desirable to provide such an entrance as will prevent any inconvenience to the inmates of the charity. It is not however necessary to offer

suggestions, which must arise in the mind of every person who undertakes to design for such buildings; a comfortable retreat for poverty from the chilling world is easily provided by the architect, when he is directed by the hand of charity.

Plate XVI.

This is the perspective view of a design for alms-houses calculated to receive thirteen poor men and their wives, allowing two rooms for each family. Seven families are accommodated on the ground and six on the first floor. In the centre of the building, over the ground floor, provision is made for a small chapel, or the same space may be appropriated as a board or committee room. The dwarf terrace is of secondary importance, but should this design be executed in an isolated situation, and in suitable grounds, it would greatly add to the appearance of the building, as well as the comfort of the inmates.

Plate XVII.

This represents the arrangement of the ground floor. A. A. are terraces, at the back and front of the building. B. is the entrance hall, which leads by passages to a staircase on each side, ascending to the chapel. C. C. are living rooms. D. D. are sleeping-rooms. E. E. are yards, with privies, coal sheds, and dust bins. Another arrangement might be made, if thought desirable; all the lower apartments might be kept as living-rooms, and all above as bed-rooms.

Plate XVIII.

Fig. 1 shows the method of preparing and finishing the window-heads.

Fig. 2 shows the method of constructing the window-sill.

Fig. 3 is an elevation of the head of the window.

Fig. 4 is an elevation of the sill of the same.

Fig. 5 is a plan of one of the mullions.

Fig. 6 is a plan of one of the jambs.

Fig. 7 is a plan of one of the door jambs.

Fig. 8 is a section of the bottom of the door, showing the footings and stone step.

Fig. 9 is the elevation of the same.

Fig. 10 is the elevation of the head of the door.

Fig. 11 is the section of the same.

A DESIGN FOR A SESSION-HOUSE.

Plates 19, 20, and 21.

The attention of the government has been for the last few years directed to the improvement of the discipline of prisons, and this consideration has naturally led to the adoption of a better mode of constructing the buildings themselves. Evidence has been, from time to time, taken upon this subject, from men who are acquainted with the usual routine of prison duties, and the reports of committees have been published, from which the architect may derive much useful and necessary information. To the architectural hints which are distributed through the voluminous reports of the committees of the House of Commons, we may especially direct the attention of our readers; but in them they will find little information concerning the arrangement of Session-houses, separated from prison establishments; and it will therefore be desirable, that this opportunity of offering a few general remarks on the subject, should not be neglected.

In arranging a plan for a Session-house, it must be borne in mind that the Court is the principal building; but to facilitate the transaction of business, and to secure the convenience of those who may be engaged, a variety of smaller rooms and apartments are required. The judges, the professional men, the witnesses, and the accused, must have suitable retiring or waiting-rooms, that the court may not be crowded with persons who have no interest or business in the immediate proceedings. All these, however, must have a ready access to the court, and this is best obtained by making it a central building, and surrounding it with a passage, which can be entered from several parts. This plan has been adopted in the design now submitted to our readers, and its advantages are so numerous, that any deviation from it must be erroneous;—some of these we will endeavour to point out.

A freedom from interruption is of essential importance in a court of justice, and this cannot be secured if the building be so erected as to face a street, or any great thoroughfare. How much the noise of vehicles passing and re-passing disturbs the proceedings, is well known in the city of London, and many other places; but if the court be made a central building, no such disturbance can arise, for the rooms and passages between it and the street prevent the noise from being heard.

This plan also admits of forming separate entrances for the accused and the accusers,—for those who are engaged in the administration of the law, and for those who are merely spectators. It is advisable, where practicable, and it is always so when the court-house is central, to form a communication between the apartments appropriated to prisoners and the dock, or enclosure in which they stand during trial. In our design, we have done this by a subterranean passage. This altogether prevents the improper expression of public feeling against those who have broken the law; and who, even when punished by it, are protected from the undue assumption of its authority by the populace. It would also, perhaps, be found desirable to have several apartments under the control of the gaoler, so that he might separate those who were condemned from those who were accused, and the acquitted from both.

One other advantage of having a court as a central building may be mentioned: it is the necessity which it involves of obtaining light from a dome or lantern. Light thus admitted is more equal in intensity, and better diffused over the building, than when admitted from windows at the side, and the strong glare which so inconveniently falls upon individuals is avoided.

In the arrangement of the court itself, or in other words, in "fitting it up," there are several considerations which must be borne in mind. The judge must have a perfect view of every part of the building, not less of the gallery appropriated to strangers, than of the prisoners' dock and the counsel's benches, for it is by his authority that order is maintained, he being, in his official character, the personification of the law, to which the accused and the accuser alike appeal. The prisoner should be in a prominent situation, where he can be seen by those who are to ascertain his guilt or innocence; and equally so the witness, whose veracity is to be determined by the same parties. Such considerations as these will not fail to present themselves to the artist when designing; but a due attention to the construction of the building, with a view to the transmission of sound, is often neglected. That the voice of a speaker may be heard in every part of the building, without difficulty, is of the utmost importance, and with a slight attention to the principles of acoustics, this may be secured. Unfortunately, however, this subject is not sufficiently understood, and we should not perhaps err in the statement, that it requires a closer investigation than it has yet received.

Plate XIX.

Is the geometrical elevation of a design for a Session-house in the Roman Doric style of architecture. This building may be connected with a prison, or not, according to the necessity of the case in which it is employed; but in preparing the plan, the author has provided every arrangement which would be required in a building of the kind, supposing the prison to be disconnected. A question may arise, as to the style of architecture to be adopted in such a structure; but, without attempting to determine which is most appropriate, we may remark, that although an unornamented exterior is to be preferred,—one marked by extreme simplicity and sobriety,—there is no reason why the principles of architectural taste should be neglected, for the mere purpose of obtaining an unornamented design. In an isolated building, intended merely for the examination of accused persons, and the discussion of legal questions, there can be no reason why pleasing decoration should be rejected. Indeed, there are many approved examples of the introduction of a simple style of Gothic in such buildings. By reference, however, to the drawings, and especially to the ground plan, it will be easy to design a variety of elevations in other styles, so as to suit the taste of all persons, and meet the general opinion as to the character which should be borne by such a building.

In this design the court-house forms the centre of the building, and around it are ranged the various offices required for the convenience of those who are engaged on trials, and for the security of the accused. On the right of the building, rooms are provided for the petit jury, magistrates, and clerk of the peace. On the left, there are rooms for the grand jury, counsel, and witnesses. The front wing is appropriated to the porter, surgeon, and lock-up rooms; and the opposite wing to the judges, attendants, and housekeeper. The intermediate spaces are intended for yards and various offices, which will be particularly mentioned in the description of the ground plan.

The court is intended to be lighted from above, which is the only suitable means of obtaining light for such buildings, while at the same time a sufficient and appropriate ventilation may be easily provided. The light obtained from above is less oppressive to the eye than that from windows in the side of the building, while at the same time the adoption of that mode of illumination enables the architect to obtain a convenient arrangement of rooms round the court, as a central building. A passage, six feet wide, connects the various

apartments with the court-house, and gives great facility of access from one part of the building to another.

Plate XX.

Is a ground plan, showing the arrangement of all the rooms, and the mode of fitting up the court-house. A. is the Court-house. 1. Judge's seat. 2. Clerk's desk. 3. 3. Witness boxes. 4. The dock. 5. Seats for counsel. 6. The spectators' gallery. 7. Grand jury box. 8. Petit jury box. 9. 9. Stairs leading to the spectators' gallery.

B. Petit jury room.
C. Magistrates' room.
D. Office for clerk of the peace.
E. Clerk's office.
F. Grand jury room.
G. Witnesses' room.
H. I. Rooms for counsel.
J. Judge's retiring room.
K. Attendants' room.
L. L. L. L. Housekeeper's apartments.
M. Porter's room.
N. Porter's bed-room.
O. Lock-up room for males.
P. Lock-up room for females.
Q. Surgery.
R. Surgeon's room.
S. S. S. S. A passage round the court.

Between the four principal parts of the building, which form radii, if we may so speak, from the central building or court-house, there are a variety of yards, rooms, and out-houses, which may be appropriated in the following manner.

1. A yard. 2. A stable. 3. Corn and hay-house. 4. Dung and dust-house. 5. Chaise-house. 6. A yard. 7. The dead-house. 8. Fumigating-room. 9. and 10. Water-closets and urinals. 11. A yard. 12. A cell for male prisoners. 13. A cell for female prisoners, with stairs from each, leading to a subterranean passage, which is connected with the prisoners' dock, in the centre of the court. 14. A coal and wood-house. 15. A dust-hole. 16. A yard. 17. and 18. Cells similar to 12 and 13, which might be employed for prisoners who have been found guilty. 19. Coal and wood-house. 20. Cleaning room. 21. Stairs to a basement, in which the apparatus required for warming the court and other rooms, might be conveniently erected.

Plate XXI.

Is a plan of the roof, showing the mode of framing and of completing it. The plate is so drawn and described as to require no additional remarks.

A DESIGN FOR A POLICE STATION.

Plates 22, 23, and 24.

None of the great changes which have in our own day been introduced, for the better regulation of society and the prevention of crime, have been more effective in their results than the establishment of a police force. The old system of constables and night watchmen was found utterly inadequate for the preservation of the peace in large towns. Crime was frightfully increasing in all populous places, and that it should have been so is not now so much a matter of surprise, as that the torrent of vice, which spreads the most devastating violence where least restrained, should have been kept within any bounds. It is, however, a painful task to turn over the records of crime in the metropolis, before a sufficient superintending and preventive force was established. Under the old system, punishment alone was the object, and, from a thousand different causes, this was not secured in the majority of those cases in which it was demanded by public justice. Of the watchmen, to whom the protection of property was entrusted during the night, many were incapable from age; and many others, there is reason to fear, were more active in protecting the thief than in preventing crime; frequently sharing in the booty, and sheltering the depredator. The entire system was essentially defective, and chiefly from the want of sufficient superintendence. We cannot, perhaps, say that the men were irresponsible, but there were certainly no means of ascertaining whether they performed their duty. By some gross dereliction or neglect of duty, or by a connivance accidentally exposed, the inefficiency or the absolute crime of a watchman might be detected, but there was no officer to superintend; and although it was the interest of every householder to see that his property was safely guarded, there were few, if any, who would take the trouble to do so. Every one, however, admitted the necessity for the adoption of a new system, and that necessity led to the formation of a police force, as it is now constituted.

Before an architect can design a building suited to any establishment, it is necessary that he should understand the nature of the establishment itself, and the mode in which the business is to be performed. No apology, therefore, is necessary for introducing a few remarks upon the system of domestic police, as now established in this country.

The object of the police is to prevent and detect crime, by a constant watchfulness over the actions of all classes in the public streets, and by rendering assistance to those who may need it, whether in the streets or in private dwellings. This is effected by a body of men called the police force, which is so ordered that no part of the city or district over which it presides is left for a moment without a watchman. A large district is divided into sections, and in each section a sufficient number of men are constantly on duty, both by day and by night. These divisions, or brigades, of the whole force, are placed under the superintendence and orders of an officer, called the inspector, who is responsible to a superior called the commissioner, to whom is communicated all that may occur in each district. For each division of the general force, or in other words, for each brigade, a station is required, and for such a building our design is intended. In small towns, all the men are under the control of one superintendent, and in such cases one station-house is sufficient.

From these remarks on the nature of the police establishment, it will appear, that, in its constitution and government, it is not unlike a military force, and that its efficiency entirely depends upon the rigorous exercise of that authority by which discipline is secured. To enforce a regularity in the performance of duty, a convenient building is of more importance than may at first be imagined. In preparing the design now presented to the public, we have taken some pains to consult the opinions of persons who best know what is required; and having obtained their approbation, we publish it with the m r e confidence.

There are two things to be secured by the erection of a police station—the safe custody of those who, from having broken the peace, are amenable to the law, and the convenience of those to whom is intrusted the power of taking and detaining the persons of those who are guilty of the crime. When an individual is taken into the station-house by a policeman, the inspector hears the charge and records it. For this purpose a room must be provided, and in addition to it a clerk's office is sometimes required. An inspector must therefore be constantly on duty, by night as well as by day; and as it is a part of his duty to see that every man under his control is vigilant, the task he has to perform is attended with much bodily fatigue, so that the room appropriated for his use should be made as convenient as possible. For the security of prisoners, cells should be provided for each sex.

The metropolitan police is, as already stated, under the management of

commissioners, from whom all orders and regulations proceed. The commissioners, however, do not at present interfere with the domestic arrangements of the various divisions, but leave the inspector of each brigade to propose or sanction such as may appear most desirable. A uniform system would, no doubt, be preferable, but this is at present almost impossible. No buildings have yet been erected as station-houses, but such places as seemed most convenient, from their locality, have been rented, to give a temporary accommodation to the men. A mess-room and a bed-room would, in all cases, be desirable; but few, if any, of the present stations enable the inspectors to appropriate apartments for the convenience of the men. We have, however, looked forward to the time when this admirable system will be made perfect, by the establishment of station-houses, and an uniform arrangement be adopted. In our plan, we have attempted to give an idea of what a police station ought to be; but at the same time we may observe, that it will admit of any alteration required by the arrangements to be ultimately established by the commissioners.

Plate XXII.

This is the perspective view of a design for a Police Station. It is intended that this edifice should be built of brick, with stone quoins, plinth, cornice, and dressings to doors and windows. It is, however, a design which may be executed in any material, according to the productions of the locality in which it may be erected. It is on a small scale, and would be suited for any provincial town with a moderately extended population, or for a branch station in a large and more densely inhabited district. By giving a perspective view, we have been able to show the side elevation, and it will be seen that we have there provided an entrance gate to the men's drilling ground. At the angle of the yard there is a turret for a bell, which would be found extremely useful for assembling the force, or directing the men to certain duties, upon pre-arranged signals.

Plate XXIII.

Exhibits a ground plan for the design. The entrance is on the left-hand side of the building, and the apartment which serves as a vestibule, is appropriated as a waiting-room for policemen. The object is to have but one doorway, so that persons entering or leaving the station may be seen by the officers. It is true, there are two back entrances from the yard into the

station-house, but these are supposed to be under the immediate inspection of some person in the establishment, and to be closed to every one who is not connected with the force. On passing through the policemen's waiting-room, the visitor enters a passage which communicates with all the rooms in the building. The first room on the right is an office for a clerk; and the next an inspector's room, in which he receives the charges made against the persons committed to his custody. At the end of the passage is a large room, suitable as a mess for the men, and adjoining it a washing-room. The clerk and inspector's offices are merely separated by a partition, which is supposed to have small sliding doors over the desk, to be opened when the clerk's services are required in taking a charge. The seat in the inspector's office should be sufficiently wide to allow him to recline during the intervals of duty. The mess-room should be fitted up with seats and lockers, or cupboards, so that every man may have a place in which he can deposit food, wearing apparel, or other articles. For the sake of security, each cupboard would be, of course, provided with a lock and key. On the left-hand side of the passage, opposite the policemen's waiting-room, there is a room for male prisoners, in which they may be confined before the charge against them is given, and from which they may be removed to the cells in the yard, should it be found necessary to detain them. The women's waiting-room is separated from the men's by a passage; and as it would be desirable to remove those females who are detained, a cell has been provided, which should be entirely under the control of the inspector. In the drilling-yard there are the necessary offices for the men, a stable for two horses, and a gig-house. At each end of the drilling-yard there are entrance gates, sufficiently large for a carriage. The drilling-yard may be conveniently covered with corrugated iron, and lighted with three zinc lights and ventilators. The cells should be paved with stone, and have strong arches over the top, with suitable ventilators, and lights in each.

Plate XXIV.

Is the chamber plan, and consists of a day and night sleeping-room for the men, and a sitting-room, bed-room, and kitchen, for the inspector. The other portion of the plan shows the covering over the yard, offices, and cells, with the lights and ventilators. All the wards, cells, and other rooms, not furnished with fire-places, are proposed to be warmed with hot air, the apparatus for which should be fixed in the basement.

A DESIGN FOR A MARKET.

Plates 25, 26, and 27.

In all towns, a public market for the sale of meat, poultry, and vegetables, is considered so desirable, that in those places where a building is not erected, the want of one may be traced more to the difficulty of obtaining the means, than to an ignorance of, or an indifference to, the advantages to be obtained. In many country towns, where it has been found impossible to obtain immediately the funds necessary for the erection of a market-house, some large public square or area, of sufficient extent, is appropriated to the purpose, and fitted up with temporary stalls for the use of salesmen on appointed market days. The difficulties, however, which at one period may prevent the erection of a market-house, are, in course of time, removed, an adequate sum is raised, and a design is required. To aid those who may be engaged in such an undertaking, and perhaps we may be allowed to say, those who are called upon to prepare drawings for such a building, a design has been thought worthy a place in this collection.

Before we attempt to describe the drawings, it may be desirable to offer one or two remarks upon what should be included in a market-house, and in what manner it should be constructed.

It is impossible to establish any rule, as to the accommodation to be provided in a market, which shall be found applicable in all cases. In every place it will perhaps be necessary to give accommodation to those who sell meat, poultry, and vegetables; and in many, to those also who deal in fish. In various localities, stalls will be required for the dealers in hardware, or even for those who sell certain articles of clothing. It will be the duty of the architect to ascertain for what purposes the market is required, and prepare his design so as to accommodate all the persons who may have occasion to use it as traders, and at the same time meet the wants of the public. Many agricultural towns will require a convenient place connected with the market-house, and yet shut out from any communication with other parts of the building, for those who deal in agricultural produce. In our design we have introduced a corn-market, which we have placed in the front entrance of the building. The advantage of this situation is chiefly, that the main street, in which that front is supposed to be built, will not be inconvenienced by

the number of persons who may be supposed to attend the market; and whatever dirt or rubbish may be accumulated, and must be, to a certain extent, cannot obstruct the traffic, or in any other way become a nuisance. These may appear trifling considerations, but upon such as these the convenient use of a building will in all cases much depend.

As to the construction of a market-house, a few remarks will be sufficient. The building should be distinguished by a great simplicity of design, and its general character, as well as its actual state, should be that of strength combined with convenience. Any expensive ornament in such a structure would be not only out of place, but really offensive to the man of taste. Compo is frequently, and much too frequently, employed in our buildings; and that which is to be avoided, where possible, in all structures, is particularly unfitted for one which is exposed to injury from the number of persons who frequent it, and the necessary liability to destruction. Compo has been much used in our own day, partly because it enables the architect to execute a design at a comparatively small cost, but not less because it gives the builder an opportunity of hiding the defects of his work. The period, however, will come, when the public will limit its use; for although it is a good substitute for stone, it is liable to a comparatively rapid destruction. In itself it may be as durable as many building stones, and even less liable to decay from the action of the atmosphere; but as it forms only an external covering, and is but slightly connected with the substance over which it is spread, a sudden blow, or a comparatively short period of time, separates it from the brick-work. It is therefore always better, when durability is sought, to construct a building of brick, and face it with clean grey stocks, laid in a neat joint, with stone dressings, than to cover the whole building with cement. But the architect must, we are well aware, in such things, be guided by his employer, though he may generally exercise some influence over the decision, by a representation of the relative advantages.

For the convenience of a public market, the passages must be wide, so as to give an opportunity to those who purchase of passing freely from one part to another, even when persons are standing round the several stalls. Ventilation is of the utmost importance, not only for the preservation of animal food, but also for the removal of those gases which are generated by the decomposition of vegetable and other matter. Nor is it less important to secure a sufficient light.

Plate XXV.

This is the perspective view of a design for a Market-house. In erecting a building of this kind, the choice of a suitable piece of ground is the first consideration. A situation should always be chosen where the fronts can be seen; and it is of great advantage to separate the building from all others, so that it may be approached from any side. A considerable area in the principal front of our design is appropriated to a corn-market, which is necessary in all towns of any importance in an agricultural district. The remainder of the building is intended for butchers' shambles, and as a general market for fish, vegetables, poultry, butter, eggs, and other commodities, usually exhibited in such places for sale. The spaces between the pilasters in the clere story are intended to be left open, to admit of a free and perfect ventilation, which is of the first importance in such buildings. The similar openings in the lower building may be filled with glass, perforated zinc, or any other substance, as may best suit the convenience of those who may occupy the stalls nearest to them. The roof is intended to be formed of wrought iron, and to be covered with corrugated iron, zinc, or marine metal. The walls may be built of brick, and the rustics run in cement; but if the locality yields a good building stone, that will of course be preferred. The floor may be either of stone or brick, laid with a proper fall and channels for drainage.

Plate XXVI.

Is the ground plan. The principal entrance leads to the corn-market only. On each side of the market there is a small room, one of which will be found convenient as a store for the corn not sold on the market day, and the other for packing away the loose stalls, and other moveable articles, used in both markets. One or both of these may have an entrance into the general market, as may be found most convenient.

From each side of the building there are entrances into the butchers' and fish markets. The stalls for the butchers might be advantageously converted into open shops, to each of which there would be one light, to be left open or filled, according to the convenience of the occupier. In the centre of the market, stalls may be erected for the sale of poultry, fruit, the products of

the farm-yard, and other articles of general consumption. In the centre of the fish stalls we have provided for a pump and a sink; and one might also be fixed with advantage at the other end of the market, for the use of those who occupy the stalls.

In executing this design, it is necessary that great attention be paid to the provision of sufficient water, and the formation of a good drainage. To these considerations the architect or builder, if mindful of his duty, will give a minute consideration, before he commences the erection of the building. For the want of this previous attention to the necessities of those who are to occupy the buildings we design and erect, permanent inconvenience is frequently felt, or large expenditures become necessary to correct the oversight.

Plate 27. Details.

Fig. 1 is half the transverse section of the market, taken on the line A B on the plan, and shows the footings, drainage, and construction of the roof, and the manner in which the whole may be lightly and securely erected. The division of the stalls should be of wood, which will give to those who occupy them an opportunity of fixing the rails and hooks, necessary for the display of the several commodities they may have for sale.

Fig. 2 is half the transverse section taken through the centre, or upon the line C D of the plan. In this drawing we have shown the mode of framing the lantern-light. The two figures together form a complete section of the building.

Fig. 3 is a section of the iron post and metal girder at *a*, to a large scale.

Fig. 4 is a section of the foot of the principal rafter at B, showing the method of forming the gutter in the stone cornice.

Fig. 5 is the interior elevation of the same.

Fig. 6 shows the method of fixing the shoe and rafter on the cornice, should it be thought desirable to dispense with the gutter in the upper part of the building; but in the wings of the lower part it is indispensable.

Fig. 7 is the elevation of the ridge and principal king-bolt.

Fig. 8 is a transverse section of the same.

Fig. 9 is the elevation of Figure 3, showing the girder, iron post, &c.

Fig. 10 is the elevation of the union of the king-bolt, and the tension and strutt rods.

Fig. 11 is a section of the same.

A DESIGN FOR BATHS.

In all eastern nations much attention has been given to the construction of baths. Among the Greeks and Romans, bathing was considered indispensable to health; and by the latter people the Baths were erected in so costly a style that the materials most valued in other buildings were in these rejected. Seneca says that his countrymen were so passionately fond of bathing, and indulged in such magnificence, that in their baths they scorned to place their feet upon anything but precious stones; and Pliny says "even the women will have seats of solid silver." The poet Statius also gives us some idea of the magnificence of the Roman baths in his description of those of Etruscus, steward to the Emperor Claudius.

"There's nothing vulgar; not the fairest brass
In all the glittering structure finds a place.
From silver pipes the happy waters flow,
In silver cisterns are received below.
See where with noble pride the doubtful stream
Stands fixed in wonder on the shining brim,
Surveys its riches and admires its state,
Loth to be ravished from the glorious seat."

In those early ages of Grecian history called the heroic, described in the poems of Homer, bathing was customary, not perhaps, as a daily exercise or indulgence, as in later periods, but rather to strengthen, invigorate, or refresh the body. Homer refers to this practice in several parts of his poems. Telemachus and Pisistratus were bathed and anointed on their arrival at the palace of Menelaus after their long and tedious journey.

"From room to room, their eager view they bend,
Thence to the bath, a beauteous pile, descend;
Where a bright damsel-train attend the guests
With liquid odours, and embroider'd vests."

Diomedes and Ulysses, after having at night spied the position of the enemy's camp, bathed previous to their repast.

"Now from nocturnal sweat and sanguine stain,
They cleanse their bodies in the neighbouring main:
Then in the polished bath, refreshed from toil,
Their joints they supple with dissolving oil."

In both these passages the poet probably refers to hot-baths, which we suppose to have been used only on especial occasions, although cold-bathing in rivers and in the ocean was very common. Consistent with this opinion is the relation of the poet that Andromache was preparing a bath for Hector on his expected return when she heard of his death.

> "Her fair-hair'd handmaids beat the brazen urn,
> The bath preparing for her lord's return:
> In vain, alas! her lord returns no more!
> Unbath'd he lies, and bleeds along the shore!"

But although bathing was frequently adopted by the ancient Greeks, they had no baths, properly so called, but large basins or vessels called *ασαμινθοι*. Public baths were not introduced until a much later period, for Athenæus says that in his day "they were but lately come into use, and that formerly no such places were allowed within the city."

We may close these few general remarks by a short extract from Dr. Potter's description of the Baths of the Greeks. They commonly contained the following rooms:—

"1. *Αποδυτήριον*, wherein they put off their clothes.

2. *Υποκαυστον* or *πυριατήριον*, a room most commonly round, and provided with fire, so contrived that it should not smoke, for the benefit of those who desired to sweat; it was also termed Laconicum, from the frequent use of this way of sweating in Laconia.

3. *Βαπτιστήριον*, a hot bath.

4. *Λουτρὼν*, a cold bath.

5. *Αλειπτήριον*, the room wherein they were anointed.

"After bathing they always anointed, either to close the pores of the body, which was especially necessary after the use of hot baths, or lest the skin should become rough after the water was dried off it.

"The feet being most exposed to dust and filth, were oftener washed and anointed than other parts of the body. Women were generally employed to wash and anoint the feet both in the heroical and later ages; it was customary for them to kiss the feet of those to whom they thought a more than common respect was due; thus the woman in the gospel kisses the feet of our blessed Saviour while she anointed them. The same ceremony was performed toward Philolean by his daughter, as he himself relates in Aristophanes." The richer citizens had baths in their own houses, and

constantly bathed previous to their repasts, and frequently after walking. The public baths were the constant resort of other classes, and afforded a convenient and comfortable asylum to the poorer sorts during the inclement periods of the year.

During the last few years more attention has been paid in this country, than at any former period, to the construction of baths. This has probably arisen in a great measure from the custom which is prevalent among the middle classes, of spending a few weeks of summer by the sea side. But our baths are not constructed in the most commodious manner, nor is there a sufficient attention to the wants of those by whom they are employed.

The design which we have prepared is intended as a complete bathing establishment, one in which hot and cold baths may be readily obtained. The bathing, reading, and refreshment rooms, are all on the principal or ground floor, and are severally lighted from above, the circular plunging bath being covered with a metal dome, by means of which both light and ventilation are obtained. The front portion of the building consists of a plunging or swimming bath and the necessary apartments for the accommodation of subscribers and visitors: the remaining portion is set apart for private baths, which are necessary not only for invalids, but for families who have an objection to public bathing.

The basement may be appropriated to the use of the Bath-keeper and attendants, and for the erection of cisterns, furnaces, and the apparatus by which the building is heated. Until recently we had but little idea of the temperature which the human body could conveniently bear, and a gradation of temperature was never attempted. After leaving a hot bath, the room itself being indifferently heated, the bather was compelled to expose himself to a chilly atmosphere, and instead of finding himself invigorated and refreshed, too frequently suffered pain and inconvenience from the sudden change. To correct this is of the utmost importance, and it can only be done by the introduction of a series of apartments appropriated to different purposes and variously heated so as to prepare the bather for contact with the atmosphere, which may easily be done with such a plan as that we have proposed.

Plate XXVIII.

Is a perspective view of a design for Baths.

Plate XXIX.

Is the ground plan. The several apartments being represented by letters of the alphabet, may be here explained.

A. The entrance hall.
B. Reading or conversation rooms.
C. Bath.
D. D. Dressing rooms.
E. Refreshment room.
H. Vestibule or retiring-hall.
I. Colonnade.
J. Stairs to domestic apartments, furnaces, &c.
K. K. Water closets, &c.
L. Vestibule connected with the side entrances.
M. M. Small private baths.
N. Domestic attending room for family baths.
O. Waiting or refreshment rooms.
P. P. Private hot or cold plunging baths.
Q. Passage leading from the private entrance to the private baths.

Plate XXX.

Exhibits the construction of the dome which lights the principal plunging bath, and is supposed to be constructed of wrought metal.

Fig. 1 is the elevation of one half the dome.

Fig. 2 is the section of the same.

Fig. 3 is a plan of a portion of the timbers for the same.

Fig. 4 is a plan of a portion of the brickwork showing the windows and iron ties.

Fig. 5 is a portion of the plan showing the metal bars, ties, &c.

Fig. 6 shows a portion of the dome in its finished state.

The construction of this dome is extremely simple, and the appearance when finished would be light and elegant. It is proposed to glaze every alternate space between the bars. The circular rods which receive the circumference of the dome are fixed to the ribs by means of screws, which secure the whole, and also allow for expansion and contraction. The lights beneath the dome should be hung upon centres, and by this means sufficient ventilation may be secured.

DESIGN FOR A CHURCH.

That rich and sumptuous style of architecture, which has been misnamed Gothic, probably took its rise, and certainly was developed, in the erection of the ecclesiastical buildings of Europe. How well it is adapted for this purpose, when guided by the hand of a master, is sufficiently evident from our own cathedrals. But there are still men who affect to despise the style, as one which invades the established principles of art, and possesses no claim upon the respect or admiration of a mind capable of appreciating the beauty of outline, and regularity of structure, so remarkable in the finest productions of Greece and Italy. Most pitiable is the mental condition of that man, who can view the noble Gothic edifices of former ages, and find in them nothing to admire,—such a man is utterly lost to the appreciation of the solemn majesty of art, and the ever varying influence of light and shade, which best exhibit the skill and taste of the architect. Nothing, however, is easier, in the present day, than to find an objection to the introduction of Gothic in ecclesiastical edifices; for the desire to increase the number of churches has so far exceeded the amount of funds provided for that purpose, that necessity, rather than choice, has compelled the erection of a great number of brick buildings, in which pointed arches have been introduced, and this has been thought a sufficient reason for designating them Gothic Churches. This misapplication of a misapplied term may have produced in some minds a prejudice against the style, extending even to its finest specimens.

It is not a question for us to decide, whether places of worship should be enriched by art, so as to produce an effect upon the mind of the worshipper consistent with the devotional feelings which ought to be felt in every address to Deity. We cannot, however, believe that the mind is so habitually in a state of devotion, or that the feeling is so easily created, as to permit us to divest ourselves of those external agencies by which the feelings are impressed. It is necessary that we should distinguish between that which withdraws the mind, by its glare, from the great, the awful business of public devotion, and that which impresses it with a feeling of solemnity, and fits it to turn its thoughts upon itself, and upon sacred, though invisible, realities. That external objects may have such an influence upon the mind cannot be denied: and if art may be introduced to aid our enjoyments, in

the parlour, the drawing room, and the library, why should it be excluded in the temple? God himself, in a former age of the church, dictated the construction and decoration of his own house; and if that may be considered as an example to us, under another dispensation, the introduction of the arts in places of public worship is not displeasing to him. We are told that the Christian system is purely spiritual: but although forms were enjoined under a previous dispensation, they were but the circumstances of religion, and the religion itself, which had regard to the same Being and the same relationship between him and the human race, was no less spiritual in its nature, than that under which we are living. If then, external circumstances and decorations calculated to impress the senses and to act indirectly upon the mind by means of outward objects, which led the worshipper to a solemnity of thought and feeling, could be adopted with the sanction and even the injunction and command of God at one period in the history of the church, it can scarcely be considered detrimental to worship at another period, the Object of worship being in his own nature incapable of change. We must, however, leave the question as to the propriety of erecting richly decorated buildings for public worship, to the decision of those who may have the control of the efforts which are now being made by individuals and societies to provide a more ample accommodation, especially for the poorer classes.

If the funds provided for the erection of a church be insufficient to admit the adoption of that style which is, by common consent, best adapted for the purpose, some other must be chosen, as it is more desirable that an unornamented structure should be raised, than that the persons for whom it is intended should be destitute of a place of public worship. But when the architect has but a small sum to expend, it is better that he should select a style in which the simplicity of the details is consistent with the general character of the architecture, than by a reduction of necessary ornament bring the style itself to suit the expenditure. The early English, or first period of Gothic, may in most cases be adapted to a limited expenditure without a loss of those ornaments or characteristics by which it is distinguished in the best specimens, and is therefore well adapted for modern churches.

The duties of the architect are not completed when he has prepared a pleasing exterior elevation and graceful interior decoration for a church. There are many minute, but most important considerations worthy of his serious attention, upon which the convenience of the building and its

adaptation for the purposes of public worship depend. So essential have these been considered by the Committee of the Metropolis Church Fund, that they have thought it necessary to publish some conditions for the guidance of architects who design for their approval, and we shall perhaps best consult the advantage of our readers by inserting them in this place.

"The undermentioned drawings and papers must accompany all plans for new churches or chapels, intended to be submitted to the consideration of the Committee of the Metropolis Churches Fund, or the plans cannot be received; and architects are requested to attend to the suggestions contained in the following paper:

1. Plans of the building at the different floors.

2. Elevations of the several fronts.

3. One longitudinal, and two transverse sections, showing the east and west ends of the interior of the church.

All the above are to be drawn to a scale of one-eighth of an inch to a foot, and in plain Indian ink.

4. A drawing showing the construction of the roof or roofs, drawn to a scale of half an inch to the foot, with the scantlings of the different timbers figured; and provision must be made for the proper ventilation of the roof.

5. A drawing showing the construction of the galleries to the same scale. the scantlings also figured; and access must be provided to the body of the church from the galleries, for the convenience of those who attend the Holy Communion.

6. A block plan to a small scale, showing the site, the approaches, the cardinal points, and the drains.

7. A description of the nature of the site, as to the soil, and fitness for foundations, and it should be stated whether there are any buildings which will obstruct the light.

8. A specification, made as full and explicit as possible.

9. A detailed estimate of the building, and the prices of the different materials and workmanship described in the specification.

"In order to prevent, as much as possible, the delay which frequently arises from the returning plans for alteration, or for further particulars, architects are also desired to attend to the following suggestions:

1. The church or chapel, generally, to stand east and west.

2. The exterior of the building to be faced either with stone or brick, and no cement to be used externally.

3. Wherever the soil is of a doubtful character, concrete is to be used in the foundations, in preference to any other material. The church floor to be raised at least three steps above the ground line, and the pathway to the church to rise one foot in twenty-five; and when the church is placed in a burial ground, the building, if possible, to be placed on a terrace two feet high.

4. The gutters, invariably, to be at least one foot wide, and the drips never less than two inches.

5. The lead to gutters and flats to be eight pounds to the superficial foot.

6. The rain-water pipes to be always outside the building, and invariably of cast iron.

7. The trusses of the roof never more than ten feet apart, and the tie-beams to be always horizontal both to the roof and gallery timbers; and the roof, in no instance, to rise less than one-fourth of the span.

8. The vestry, or robing room, to be, if possible, at the east end, and always to have access to it from without.

9. The height under the galleries to be at least ten feet under the brestsummer, the gallery fronts not to be executed in plaster, and the gallery for the children to be so raised, that they may be seen by the officiating clergyman. The spaces between the galleries to be, in every case, at least one-half of the entire width of the church, and in no case less than twenty-four feet.

10. At least four common flues must be provided in all cases.

11. Two ventilators to be placed in every alternate window, one at the top, and one at the bottom; provision also to be made for the ventilation of the roof, and capacious apertures to be provided for the admission at pleasure of a large quantity of air under the floor of the pews, and for its admission into the church through the skirting.

12. If there are to be vaults, the access to them must be from the outside of the building, and great care to be taken to prevent any passage of air from the vaults into the church.

13. No square or double pews, and all pews and sittings to face the Communion Table, and to be numbered, and the words "Free Seats" written on each of the free benches.

14. The clergyman's pew, and sittings for the clergyman's servants, to be provided on the ground floor.

15. The least possible separation of pews and free sittings, in order to intermix, as much as may be, the rich and poor of the congregation.

16. In order to provide accommodation for kneeling during public service, the space in each pew and free seat must not be less than two feet eleven inches from centre to centre, when the height does not exceed three feet two inches from the floor of the pew; nor less than three feet, if the height be greater; twenty inches to be allowed to each person.

17. The pew and free-seat framing to be the same, with the exception of low doors for the pews, and to be not less than three feet two inches, nor more than three feet eight inches high.

18. The backs of the seats to incline backwards about three inches. The free sittings not to be provided with kneeling boards.

19. The pulpit and desk not to obscure the Communion Table, and to be placed as near as possible to the east end of the church; the angle formed by the chancel to be preferred.

20. A space for a font to be always provided, in a position to be seen by the congregation, and, if possible, at the west end, with accommodation for the sponsors.

21. Entire absence of pews in the chancel.

22. The Creed, the Lord's Prayer, and the Commandments, to be written in a proper position at the east end of the church; a Communion Table to be provided, and as much space as possible about the rails for the Communicants.

23. The middle of the church to be open from west to east, with cross-benches for free sittings.

24. The cross-benches at both the east and west ends to be moveable on slides or railways, to make room for Funerals at the west entrance, and at the east end for the Communion.

25. The Committee will not permit any alteration to be made in plans, nor will they defray any extra expense, unless previously sanctioned by them.

26. Architects are particularly desired to take care that an accurate account is kept of the quantities of customable and exciseable articles used in the building.

27. Tenders for the performance of works are not to be obtained till the Architect has received written instructions from the Committee.

28. The advertisements for tenders for churches to be built from this Fund, or for any other purpose, are to be headed "Metropolis Churches Fund."

29. The contracts for enclosing the churches must be entered into at the same time as the contract for building.

30. The architect must deposit in the office his plans of the church, previous to his receiving his commission on the works.

31. Final payment will not be made to the contractor until her Majesty's Commissioners for building New Churches have passed the declarations of the materials used in the building.

32. No church bells to be provided in the contract.

33. The tenders for the church to be made out without any reference to the drawback on the materials used."

These suggestions are worthy of the most careful consideration by all persons who design for churches. They are the result of a long experience, and are prepared by a body of men who have had a better opportunity than any individual architect of observing the results of various plans, and we might probably say, of numerous experiments. Taking these, in connexion with our designs and details, the mode of church building will, it is hoped, be sufficiently evident to enable the student to pursue his investigations with advantage to himself, and at the same time guide those who may be better acquainted with the general principles of the art of building.

Plate XXXI.

This is the perspective view of a design in the Gothic style of architecture. The church is intended to consist of a nave and two side aisles, but is covered with a single roof: the span is considerable, but may be constructed with ease by following the details given in a subsequent drawing. The church is calculated to contain about fourteen hundred persons, of whom eight hundred are accommodated in seats.

Plate XXXII.

One-half of the plan presented in this plate shows the ground floor, and the other the galleries, with the method of pewing. There are three entrances to the church; one through the porch in the front, and one on each side. In the space on each side of the tower the stairs to the galleries are placed. On either side of the altar is a vestry and a robing room, with an entrance into the church. The free seats in the centre aisle are intended to be moveable, so as to give a free approach to the altar for

funerals. The back seats in the gallery are free; the front of the gallery is intended for the organ and organist, and the Sunday or charity school children.

Plate XXXIII.

Is a transverse section and perspective view, looking towards the altar, showing the general appearance of the interior of the building, and the construction. The pulpit is shown on one side of the church, and the reading-desk on the other, in order that a better view may be obtained of the altar from the body of the church, than can be procured by most of the worshippers when they are fixed in the centre: and by elevating them a little more than usual, the clergyman will be seen by every person who is present.

Plate XXXIV.

Is a transverse section, showing the porch, entrance, pewing, and altar. By comparing this with the preceding plate, the construction of the building will be readily understood. The bell-turret is proposed to be built of stone, and supported by metal girders from the principal walls. The two brick octagon towers must also have iron angular ties from the walls above the roof.

Plate XXXV. Details.

Fig. 1 is the head of the iron for receiving the principal rafters of the roof.

Fig. 2 shows the cast iron abutment with a wrought iron clip that catches the tie-beam, and can, by means of the bolt which goes through the cast iron head, be screwed up to any truss or camber that may be required.

Fig. 3 shows the clip and shoe which receives the tie-beam upon the central walls. (See the transverse section.)

Fig. 4, a section of the cast metal which comes under each tie-beam: this is intended to be painted in imitation of oak.

Fig. 5 represents the clip, and shows the method of fastening that portion of the roof which is over the aisles.

Fig. 6 is the nut by which the parts represented in figures 3 and 5 are united together.

Fig. 7 is a sectional and perspective view of a part of the gallery floor, showing the manner of finishing the front of the gallery, and the mode of construction.

Fig. 8 is a sectional and perspective view of the pews on the ground floor.

Fig. 9 represents the connexion of the wood or plaster-beams of the ceiling with the iron ones under the tie-beams.

Fig. 10 shows the mode of finishing the jamb of the windows.

Fig. 11 is a mullion of the same.

Fig. 12 represents the mouldings and the mode of finishing the head of the window.

Fig. 13 shows the sill and plinth mouldings.

Fig. 14 is the elevation of the corbles under the tie-beam.

Fig. 15 is a plan of one of the principal columns.

Fig. 16 is an elevation of the same.

Fig. 17 is a plan of one of the side pinnacles and buttress.

Fig. 18 is an elevation of the lower part of one of the side pinnacles, showing the finishing upon the face of the buttress.

Fig. 19 is a section of the bottom part of the buttress.

Fig. 20 is a section of the top part of the buttress.

Fig. 21 is a section of the hand-rail for stairs.

Plate XXXVI. Details *continued.*

Fig. 1 is the head of one of the side windows, showing the method of finding the centres for striking the same.

Fig. 2 is the bottom of the same window. The details of the several parts are given in Plate 32.

Fig. 3 is the plan of one of the small octangular turrets at the entrance porch, showing the method of finishing on the angle of the plinth.

Fig. 4 is an elevation of the bottom of the same.

Fig. 5 is an elevation of the top of the turret.

Fig. 6 is the profile of the plinth.

Fig. 7 is a section of the cornice for vestry and robing room.

Fig. 8 is the plan of one of the octangular pinnacles.

Fig. 9 is an elevation of the same.

Fig. 10 is an elevation of the parapet of the porch.

Fig. 11 is a section of the same.

Fig. 12 is an elevation of the head of the door.

Fig. 13 is a plan of the door and frame.

Fig. 14 is a section of the door and frame.

Fig. 15 is an elevation of a portion of the door.

A DESIGN FOR A CHAPEL.

The Christian doctrine maintained by the greater number of the protestant dissenters of this country is in every respect the same as that received and taught by the established church. Their separation from the national church has arisen from a difference of opinion as to the form of government, and the manner of conducting public worship. At the time when this separation from the established church of the country was effected, the persons who were the leaders in this schism, were exposed to much obloquy and persecution, and being for the most part destitute of property, they were compelled to adopt various expedients to effect their objects; and where they ventured to erect places of worship they were distinguished by an utter disregard to architectural taste. In examining these buildings, we are almost led to the conclusion, that in this neglect of all that could please a cultivated taste there was as much pride as principle; but when we consider the unmerited scorn and opposition with which their conscientious objections were met, we may find some excuse for them in the common, the universal disposition of the human mind to fall into the error of extremes.

That the Dissenters have done much to produce that mental activity which distinguishes our day, and to subdue the barbarity of which so large a remnant continued to sway the minds of the rural population so late as the middle of the last century, cannot be denied. But while they have been active in the improvement of the general state of society, and in creating, as instruments, a deeper regard to religious principle, though too frequently mingled with feelings which throw a shade over their exertions, they have themselves received an indirect benefit. The stern indifference, we might say contempt, with which every approach to architectural taste and decoration in their chapels was viewed by the founders of the several branches of protestant dissent, has ceased to influence the minds of those who in the present day adopt their opinions. They are now a large and influential body of the community, possessing a good share of the wealth and intelligence of the country, a people active in benevolence, and earnest in the acquisition of knowledge. No longer under the ban of public opinion, they begin to feel that while they live in their "ceiled houses," the house of God should not be left destitute, and that its decoration is at least allowable, if not a matter of duty, when the means can be obtained from the congregations for whom it is to be erected.

Plate XXXVII.

This is a perspective view of a design for a Chapel suited to the forms of worship commonly employed by Protestant Dissenters. The Roman style of architecture has been adopted, as that best suited to the character of the building. It is erroneous to suppose, that the dissenters of the present day, as a body, object to the introduction of any architectural ornament in their places of worship; for although they are of opinion that large sums of money should not be expended in rich and elaborate decoration, they approve of, and are anxious for, a chasteness and elegance of design. The early period of Gothic would not be considered inappropriate, but the more decorated orders of the same style would be rejected, partly from a feeling that the cost would exceed what ought to be spent upon any single structure, and partly from the fear that such a building would tend to withdraw the mind from the great object of religious worship. From many remarks we have made in the course of this work it will be evident that our sentiments are not thus moulded, but at the same time we cannot too strongly insist upon the impropriety of erecting such miserable designs as are, from an erroneous opinion of the sentiments of the dissenters upon this subject, frequently constructed as places of public worship. Simplicity should be the prominent feature in such buildings; and if taste be under the control of this principle, the artist can scarcely err in the production of a suitable design.

It is scarcely necessary to remark, that in the execution of our design, it would be desirable to employ stone, if there be a suitable one in the locality. If a good stone cannot be procured, the walls may be built of brick, and the embellishments be executed in stone or in Roman cement.

The turret which has been introduced above the ridge in the centre of the building may be omitted, if thought desirable; but before this is resolved upon, the builder should well consider the reasons which have induced us to recommend its adoption. It is intended to facilitate the ventilation of the building, and will be found a much more desirable method of effecting that object than the system now commonly adopted. It acts as a shaft for the passage of the heated air. Upon the ceiling of the chapel immediately below it, an ornamental open rosette should be introduced, and through this the rarefied air will escape,—a greater draught, to use a common phrase, being produced by the contraction of the chimney

or shaft through which it has to pass. To secure still more perfectly the ventilation of the building, some ornamental iron work may be fixed in the cove of the ceiling, immediately over the interior cornice. To provide for the ingress of a sufficient amount of cold air is not less important, and this may be done by a suitable construction of the windows. The sashes should be formed of cast metal, and one-half of each should be hung on pivots so as to be opened and closed by means of rods and springs introduced into the walls of the building, and easily worked by the persons in attendance.

If this elevation should be considered too expensive for a situation in which a dissenting chapel is required, it will be easy to reduce the cost and retain the leading features, so as to meet the wishes of the contracting parties. Thus, for instance, the pilasters and circular architraves may be omitted; the exterior face of the walls being carried up in plain brickwork. The brackets and parapet walls may also be removed, leaving only the cornice and a plain brick blocking course. Or if a still greater diminution of expense should be required, dripping-eaves might be substituted on the sides and over the back elevation.

It will not in all cases be possible to obtain an isolated site for such a building, or one on which all the sides can be seen. A sufficient space for the admission of light is however necessary in the erection of our design, so far at least as its side elevations are concerned. If no light can be obtained at the sides, it must be admitted by a lantern or dome; and then a differently constructed roof will be required.

Plate XXXVIII.

Represents parts of the ground and gallery plans.

Fig. 1. Exhibits half the ground plan. The entrance from the street into the body of the chapel is in the centre of the principal front, where a lobby is provided, to prevent the confusion which would arise from a more immediate connexion with a public thoroughfare. The stairs to the galleries are on each side of the principal lobby, and the same stairs may be continued to the school-rooms in the basement, on one or on both sides, as may be found most convenient. We have shown that mode of pewing which seems most appropriate to a place where public instruction is a principal object.

The arrangement of a chapel for the use of protestant dissenters differs in several particulars from that of a church; and to these it will be necessary

to direct the attention of the reader, for we have frequently known architectural draughtsmen to fall into serious errors from an ignorance of the difference in the mode of fitting these two classes of buildings. In the dissenting chapel there is no altar, both the sacraments being administered in a large square pew, in which the clerk's desk is usually fixed, as shown in our drawings. A large vestry, for use in occasional services, is also essential in all chapels which have not school-rooms attached. In our plan we have shown a small one for the use of the minister, which is entered from the side of the building. Should the school-rooms in the basement be rejected, the vestry might extend the whole width of the building, or a small and large vestry might be formed; and if the latter were separated from the chapel by a sliding partition, it might be made useful for public as well as private services. These are the principal points of difference between the episcopal and the dissenting chapel. Organs are occasionally but not frequently introduced.

Fig. 2. Is a part of the plan of the galleries, and being constructed in the usual manner does not require any particular description.

A building erected according to these plans, would hold about eight hundred persons, exclusive of the free and children's seats: but it will be easy to employ the design for a chapel of any size, so as to accommodate a greater or less number of persons as may be required.

Plate XXXIX.

This plate is a perspective view of the interior, and will give to the architect or the builder all that he can possibly require for the construction and finishing of every part. A person in any degree accustomed to architectural drawing, will be able from this to prepare the details required by the workmen.

Fig. 1. is a transverse section and perspective view of one-half of the building, showing the mode of construction.

Fig. 2. is a transverse section and perspective view of one-half of the building, showing the mode of finishing. In this part of the drawing the ornamental rosettes or ventilators are shown, as well as those in the cove over the cornice.

DESIGN FOR A LIBRARY AND READING ROOMS.

The establishment of public libraries is not of recent date. At various periods, and among different nations, libraries have been formed, which have become the receptacles of all the intellectual riches of the age. To draw a comparison between these and those of modern origin, however, is not an easy task, as their characters are essentially different. The library of the Roman patrician, was the repository of a few rolls, which were more or less, faithful copies of the writings of some of the most talented men of his own or a preceding age. The large public libraries, such as that of Alexandria, differed in no respect from those of rich citizens, except in the number of the manuscripts possessed. Of the great majority of these ancient works there were but two or three perfect copies, while others were the original productions of their authors, from which no copies had been made. At such periods, not only the fame of authors, but the intellectual illumination of mankind, rested on a more slender foundation than in the present age. That unfortunate day which witnessed the destruction of the Alexandrian library, erased from the records of time many names which would otherwise have been held in perpetual remembrance; and at the same time deprived all subsequent races of mankind, of the proudest memorials of the intellectual strength of their species. The invention of printing, and the consequent multiplication of copies, present a formidable obstacle to the recurrence of such an event. The productions of mind are no longer confined to the rich; nor can the accidental or wilful destruction of a public library, destroy the records of the conquests of mind, whether in the bold efforts of imagination, in the sober relations of history, or in the profound investigations of science. All intellectual efforts have now become the property of man, whatever may be the language he speaks, and on what locality soever he may reside. The names of Shakspeare, Milton, Tasso, and Goethe, among the poets; of Newton, La Place, and Davy, among the philosophers, will be more securely handed down to posterity in printed books, than if engraven on superb monuments in every country of the globe. The efforts of their genius are not confined to the present times, nor to the countries which gave them birth; they belong to all times, all nations, and to every man. With them we can now hold familiar and daily intercourse; nor are we compelled for this

privilege, to waste our substance, nor is the present enjoyment ever lessened by the fear of some future deprivation. Great are the advantages in every respect that we possess over the nations of antiquity, but above all we may place the facility of obtaining education, and the acquisition of printed books.

The art of printing has necessarily increased research and the number of authors. To obtain all that is published, is beyond the hope, and perhaps the wish, of the most ardent lover of books; but there are few men in any degree "given to reading," who do not wish to peruse many books which they are unable to purchase. If a man has but one subject of study, which is indeed a rare event, he must have an ample fortune to obtain all that is published upon it, or to collect all the information acquired by others. Public libraries are therefore desirable, and have been established in nearly all the large towns of this country. By the combined exertions of many, works of established reputation and of great cost, are purchased, and are open to the use of all who may be connected with the institution. A design for a building of such a character we have here presented to our readers; and before we attempt to explain the plates, it may be desirable to make a few general remarks.

A public library should consist of one large room in which books may be kept, and it should, if possible, be lighted from the roof. The architect must be careful to secure a general quietude of character, and for this purpose an equally diffused light is essential, especially as the library itself is frequently used for reading. Connected with the large room, there should be some small apartments for study, which may have side windows. For these a southern or western aspect is desirable. In a building of this description, where persons are supposed to spend a portion of their time without bodily exercise, and as such persons are generally of sedentary habits, an equable temperature in the apartments occupied by them is of great importance. The architect must, however, in every particular, study the comfort of the student in the arrangement of all parts of his building; and as he must have felt the value of trifling arrangements when he was himself a sedentary student, the provision for the comfort of others may be safely left in his hands.

Plate XL.

This is the perspective view of a design for a Library and Reading Rooms in the Grecian Ionic style of architecture, which from its simplicity and elegance is admirably adapted for such a building.

Plate XLI.

Is the principal plan for the design, which may be easily explained by reference to the letters by which the several apartments are distinguished. A is the entrance hall. B the porter's room. C an office, or servants' waiting room. Both these rooms are connected with a passage which leads by a staircase to the basement. At the end of the entrance hall there are a few steps to a landing, D, and from this two flights of steps rise, one on either side. E and F are rooms appropriated to the use of the secretary or librarian, and those on the same level over B and C may be given to the assistant, or otherwise employed as may be found necessary. G is the library, with its appropriate fittings. *a* is the table, *b b b* are bookcases. On each side of the library there are three rooms, H H H, which may be used as reading rooms, and will also be found useful to keep rare or expensive books. In each of these a table, *a*, is placed for the convenience of those persons who may employ them as studies. The rooms I I may be appropriated to newspapers and periodicals. J J are urinals and water closets. K is a back entrance, with a staircase leading to the library, and also to the basement. The reading rooms are lighted by windows at the side, as shown in the plan. The library should be lighted by side windows above the bookcases, and also from the roof, which should be formed of cast metal. This may be done so as to give a very imposing and beautiful effect. Tie-beams of an elliptical form should be introduced about five feet apart, and every alternate compartment, divided into panels, should be glazed. The height of the room, from the floor to the cornice, should be thirty-five feet, and the smaller rooms about thirteen feet. The dimensions of the several parts may, however, be taken from the drawings.

The basement should not be less than nine feet in height when finished, and may be divided into various rooms for the use of the establishment, as may be found most convenient. Provision must at the same time be made for the apparatus employed to warm and ventilate the building. This subject requires the especial consideration of the architect, many of the modes now in use having been proved, by the fires which have happened in various parts of the country, exceedingly unsafe.

Plate XLII. Details.

Fig. 1. This is one-half of the transverse section of the roof, to a large scale, showing the foot of one of the cast metal elliptical ribs, with the light. The builder will readily perceive from this drawing, the mode of attaching the girder to a shoe, and of fixing the shoe to a stone wall plate. The same drawing shows the side windows, spoken of in our description of the plans as being introduced above the bookcases.

Fig. 2, is a section, one-eighth of the full size of the cast metal elliptical rib, with the slide light, on one side; and the timbering for the marine metal, or zinc covering, on the other. These ribs should be cast hollow from the under side of the bearers, and may be intersected by wood or plaster transoms, so as to form the panels in alternate spaces between the cast metal elliptical ribs which have not the lights. The slide lights may be opened and closed by means of rods and cranks hidden within the walls, and will form an admirable means of ventilating the building.

Fig. 3, is the profile of a cornice intended to be used over the wing windows.

Fig. 4, is the profile of the architrave for the same, and for the upper side windows.

Fig. 5, is the profile of other cornices.

Fig. 6, is the astragal for the upper cornice.

Fig. 7, is the transverse section of the wing buildings, and the sill of the side windows to the library. The mode of framing the roof will be readily understood, and in construction will be found extremely simple.

Fig. 8, is a section of a portion of the principal floor, which is supported by metal girders.

Fig. 9, is a section of the footings.

A DESIGN FOR AN HOTEL.

Great improvements have been made in the construction of hotels during the last few years. The best houses of this kind now possess all the comforts and elegances of private residences; and there is, perhaps, no class of buildings in which the architect has a better opportunity of exhibiting his taste, judgment, and knowledge. But before he can commence the preparation of a design, he must fully understand the object of the building, the class of persons for whom it is intended, and the character of the town or locality in which it is to be erected. The design which we have prepared is intended for a market town with a considerable population, one in which there is sufficient wealth to support occasional assemblies, and such a public traffic as to offer the expectation of visitors requiring private apartments and family comforts.

Those persons who have not visited the continent, and especially the northern countries, can have no idea of the superiority of accommodation given to travellers in this country above all others. Even in the most distant and least frequented parts of England, comforts are to be found, which are at least sufficient for the casual visitor; and in towns of any importance he will find all that he can wish. This is saying much, but not too much, for the hotels and taverns of this country; especially when it is considered, that in all our social and domestic arrangements we are habituated to the refinements, and almost the excess of personal and relative comfort. The public has demanded this accommodation, and it has been readily supplied by the aid of those arrangements which are provided by the architect. Great care, however, is required in designing for an hotel, and especially with a view to secure sufficient light and ventilation, which is not always an easy matter, as a large space is usually covered by such buildings. But this difficulty is met by the necessity of introducing some large rooms for public purposes, in which it is desirable to give light and ventilation from the roof.

Plate XLIII.

This is the perspective view of a design for a Commercial and Family Hotel. From this design it will be perceived that an admirable effect may be produced by a suitable arrangement of the piers, but of course much will

depend upon the care which is taken in gauging and rubbing the arches. The mode of building here adopted will also be found an economical one, for the piers being made to project four and a half inches, a less thickness of brickwork between them causes a considerable saving of material in a building of any extent.

Plate XLIV.

Is a plan of the principal or ground floor. The entrance to an hotel is most conveniently placed in the centre of the principal front, and an ample hall should be provided, as shown in the drawing. On the left-hand side of the hall is a commercial room, intended chiefly for the use of travellers; and on the right-hand side a coffee room for general purposes. Immediately fronting the entrance are the bar and bar-parlours, which are surrounded by a passage, and lighted from above by glazed zinc sashes. A sufficient light will thus be given to the bar and bar-parlours, as well as a free ventilation to the entire body of the building. Immediately behind the commercial and coffee rooms are the staircases leading to the basement floor, and also to the upper stories of the house, which should be appropriated as private sitting and bed-rooms. It would, perhaps, be found of advantage, that one of these staircases should be used exclusively by the servants and other members of the establishment, and only one staircase be formed to the basement, which should be on the same side. The left-hand side of the building may be appropriated to some large rooms for public assemblies. The larger room may be fitted up with a moveable rostrum or orchestra, the access to which should be from a door over the passage which surrounds the bar. To make this room available for smaller parties, or for general purposes, it may be divided by a portable or folding partition. Adjoining the assembly room is a card or supper room, and at the same end of the building, on the opposite side, is a dining room. The advantages to be obtained from this situation are numerous, and point it out as a desirable arrangement. It will be observed, that the plan is so formed, that there is a passage way through the entire building, and an entrance from the back as well as the principal front. The dining room would be found exceedingly convenient for market dinners, and general use on periodical occasions; but it is also available when large parties or assemblies are held, requiring the use of both the large rooms for amusements, as it might then be

converted into a supper or refreshment room. Adjoining the card and supper rooms there are private rooms, on one side intended for the use of ladies, and on the other for gentlemen, with water closets attached. Entrances to these rooms are provided from every side, so that the one which may be most convenient for the occasion can be opened, and the others closed. On the right-hand side of the bar there is a smoking room, and adjoining it two parlours. The builder will do well to be careful in ventilating the smoking room, which is of great importance to the general comfort of the house. At the end of each of the side passages there are a small yard, water closet, and urinal, the latter being supplied with water from cisterns above.

The height of this floor should be, throughout, fifteen feet, except the room for public meetings or assemblies, which should not be less than twenty feet high, to secure a good proportion and proper ventilation. Over this room there should be a mazzineere story, to be divided into small bed rooms.

It has not been thought necessary to give a plan for the basement story, as it is in a great measure fixed by the ground plan, and may be divided and appropriated as shall be found most convenient for the purposes of the hotel. The architect or builder will of course provide kitchens, sculleries, apartments for warming apparatus, cellars, water closets, and all other conveniences required for the domestic arrangements of a large establishment. The height of this floor should be nine feet six inches.

In the arrangement of the first floor it will be desirable to appropriate that part over the hall, commercial room, and coffee room, and also that part over the card and dining rooms at the back of the house, if the situation of the building will admit, into suites of apartments for the use of families. The sides may be appropriated for bed rooms. The height of this floor should be ten feet.

The upper or attic story can be divided into eight or ten good bed rooms, the number being regulated by the size that shall be considered most desirable, a passage being formed in the centre, and the rooms arranged on each side. This story is intended to be eight feet six inches high, which will be sufficient for such rooms.

The roofs of these buildings may be constructed of either wrought or cast metal, and covered with slate. All the sky-lights, and particularly that round the passage, should be constructed of zinc or light wrought metal.

Plate XLV.

Fig. 1 is the elevation of half the principal entrance, showing the balcony and a part of the first floor windows.

Fig. 2 is a portion of the section of the same, showing the construction and the method of finishing the inner and outer doors. A is a stone cornice and architrave. B, timber lintel. F, framing and panelling of soffit. C, flooring boards of first or principal story. *a*, the floor joists. D, the shutters. E, the balustrade over the cornice. G, the external door, folded back on the side jamb, prepared to receive it. This door should be framed from two-inch oak, with double or single panels. H H, one and a half inch folding mahogany sash doors, hung upon centres. I, the stone landing, which should be three inches lower than the top step, to allow of the opening of the door over the mats. L is a cavity, or cutting, the whole length of the stone, to carry off the surface water. K K, stone steps to the entrance. M, principal wall. N, cross walls.

Fig. 3 represents one-half the ground plan. A is the outer door. H, the inner sash door. B, the stone mullion for cantaliver. C, stone step.

Fig. 4 is a plan showing the projection upon the first floor.

A few remarks on the mode of construction will perhaps be expected, but these need not be many. The plinth, base and caps of the pilasters, the cantalivers, window sills, and all embellishments, should be executed in stone. The face of the building may be either in coarse brickwork, to be covered with cement, or it may be finished with picked stocks, tuck pointed, which should be preferred, as most durable, and as giving a bold relief to the stone ornaments. The floor line of the ground story is intended to be two feet six inches above the ground line, and this will bring the windows of the basement within a foot of the level of the pavement. The area may be enclosed by iron railing round the wall, or with iron horizontal gratings, flush with the pavement. If the latter plan be adopted, an inclined area to each window will be desirable, but care must be taken that the falls are so constructed as to carry off the surface water without difficulty.

A DESIGN FOR A GAS-HOUSE.

MANY of the scientific discoveries of the present day have been distinguished by their adaptation to the wants of society. The gas obtained from coal was long known before any proposal was made to use it as a means of artificial illumination. It may appear strange to the well-informed reader, that an application most obvious and desirable should have been so long undiscovered; but all inventions which are really valuable to the public have been in the same manner delayed, and we are always surprised that things so evident should not have been made known before. Since about the year 1814, gas lighting has been generally adopted, so that there is not now any town of importance in this country without its gas works. Since its introduction many important improvements have been made in the machinery employed for its production, and it has been extracted from oil, tar, resin, and other substances as well as coal. In our Design we have endeavoured to represent the gas works in the most improved state to which they have been brought by modern science; but to prepare the reader for the study of the subject, a few general remarks seem to be necessary.

A number of cast-iron vessels called retorts, generally of a cylindrical or oval shape, are set in a brick furnace, in such a manner as to secure the application of heat in the most ready and economical manner. Supposing them to be thus fixed and the fire to be lighted, they are raised to a red heat, and then about half filled with coal, after which the mouths of the retorts are closed and carefully luted, generally with clay. In a short time the decomposition of the coal commences, and those parts which are vaporized are conducted by bent tubes, called the dip pipes, into a large horizontal cast-iron tube called the hydraulic main. The dip pipes are brought into the hydraulic main, so called because it is half full of water, in such a manner that the gas must pass through the liquid, by which a portion of the vapour of tar and ammonia are condensed. The gas rises to the upper part of the hydraulic main, and is conveyed by another pipe to the condenser, which is made of various forms and materials according to the opinion or fancy of the engineer. In passing through the condenser, the gas is so much cooled that the vapour of tar and ammonia which still remains mixed with the gas is condensed, and the products pass into the tar cistern. It may be here necessary to point out

the distinction between a vapour and a gas. They are both elastic fluids, but while one permanently retains its form, the other is easily condensed into a liquid. Water may be converted by heat into a vapour, but immediately the steam, that is, the aqueous vapour, is exposed to the common temperature of the atmosphere, it is condensed and becomes water again. Now this is the characteristic of all vapours,—they may be brought into a liquid state by cold. No degree of cold can condense a gas; it is a permanently elastic fluid under all the common conditions of the atmosphere. It is true, that by the aid of enormous pressure, some of the gases have been condensed by chemists, but others have resisted all the efforts which have been made to convert them into liquids. The gas which is sought for by the manufacturer as a means of illumination, is that which is called carburetted hydrogen, but in the distillation of coal some others are thrown off, especially the sulphuretted hydrogen and carbonic acid gas. As no degree of cold can condense these, the passage through water has no effect upon them, and other means must be adopted to separate them from the carburetted hydrogen with which they are mixed. For this purpose the gas is conveyed from the condenser into a vessel called the purifier, which contains lime or lime-water. This substance has a strong affinity for sulphuretted hydrogen and carbonic acid gas, and in consequence a chemical union takes place between them. When gas was first introduced many objections were urged against its use, and among these the unpleasant and unwholesome atmosphere produced by its combustion, and the discolorization of all bright metallic surface, were not the least. The purification of the gas, or in other words, the separation of those substances with which it is mixed, but not required for combustion, has corrected these evils, so that it is now, in reference to health and cleanliness, as well as intensity and economy, the best means of artificial illumination. From the purifier, the gas is conducted into the gas-holder or gasometer, from which it is conveyed to any place where it may be required for use.

Since the introduction of coal gas, works have been erected in almost every large town in the principal countries of Europe, either by companies or private speculators. The inventions for the improvement of the several parts have been almost as numerous as the works which have been established; and to examine and describe these, would require a greater space than we can devote to the subject, and would, moreover, have a doubtful value, did our limits offer the temptation of making such an attempt. A short history, however, of this important invention will be interesting to every reader.

Dr. Clayton appears to have been the first person who ascertained that in the dry distillation of coal, an inflammable gaseous fluid was evolved. This discovery was published in 1739, in the Transactions of the Royal Society. Some time after, Dr. Hales made experiments on pit coal, and discovered that when it was distilled in closed vessels, nearly one-third of the weight was lost by the escape of inflammable vapour. In 1767, Dr. Watson, Bishop of Llandaff, performed some other experiments, but he does not appear to have made any attempt to employ the gas. In 1792, Mr. Murdock, of Redruth, in Cornwall, commenced a series of experiments upon the quantity and quality of the gases contained in coal, peat, wood, and other substances, and during his investigations he appears to have originated the idea, that by confining the coal gas in suitable vessels and tubes, it might be employed as an economical substitute for lamps and candles. With this opinion, he commenced his experiments by the generation, in iron retorts, of coal gas, which being conducted by tinned iron and copper tubes to a distance of seventy feet, he was able to ignite either at the termination, or at any intermediate point. Having ascertained that the gas might be conducted to a considerable distance from the vessel in which it was made, he directed his attention to the size and forms of the apertures for the purpose of ascertaining which would be most suitable for the combustion of the gas, and produce the greatest amount of light. It was at this time that the cock-spur, bat-wing, and argand burners, which are now most commonly employed, were introduced. These and other experiments established the fact, that gas might be employed as an artificial light, but Mr. Murdock was prevented for some time by other engagements from taking the necessary means for its introduction. In 1798, however, he constructed an apparatus for lighting the works of Messrs. Boulton and Watt, at Soho. In 1803 and 1804, public exhibitions of gas lighting were made at the Lyceum Theatre, and proposals were issued for lighting the public streets. An experiment was in fact made in Pall Mall, but was supposed to have failed, and the plan was abandoned. In consequence of this the general introduction of gas-lighting was delayed until the year 1813, when the Chartered Gas Company erected their works in Peter Street, Westminster. Soon after this, the invention, or as it might be more properly called the discovery, attracted almost universal attention; great improvements were made in the manufacture, so as to secure economy and cleanliness, and one town after another adopted it as the best means of artificial illumination. It is now not only employed in the public streets, and in shops and ware-

houses, but also in the dwellings of all classes, and it is done without injury to the richest articles of furniture, if sufficient care be taken in its manufacture and application.

Gas is also frequently used for the illumination of public clocks. The application of it for this purpose was first made at Glasgow. In that city there is a clock with two faces, supported by a projecting bracket, and surmounted by a carved phœnix. The jets are placed above the clock, and the light is reflected from mirrors, fixed on the under side of the wings of the phœnix. To light the burner without the trouble of ascending to a considerable height, a pipe, in addition to that which supplies the gas for consumption, is laid on to the burner, with a stop-cock at its junction with the main. This tube or flash-pipe, as it is called, is perforated through its whole length with numerous small holes. When the stop-cocks are opened, the gas flows through both the pipes, and of course, issues from the holes in the flash-pipe. As soon as a light is brought into contact with either of these, the flame rises through the whole length, and ignites the gas issuing from the illuminating jet.

We may now close these preliminary observations with a few remarks on the nature of those gases which are given off during the distillation of coal. The gas is, as already stated, hydrogen, but intermixed with other gaseous or vaporous matters. To distinguish between these, and to separate those which are either incombustible, or produce during combustion, an unhealthy atmosphere, is of the greatest importance.

Hydrogen gas is obtained for the purposes of experiment by pouring sulphuric acid, diluted with five or six times its weight of water, upon iron filings; or by acting in the same manner upon zinc with sulphuric acid, diluted with about eight parts of water. Hydrogen gas is readily detected by its odour, which is very disagreeable. Animals cannot breathe it, and a flame is extinguished when plunged into a vessel containing it, although it is inflammable when ignited in the atmosphere.

Carburetted hydrogen, sometimes called heavy inflammable air, is obtained by purifying coal gas. It burns with a yellow flame, and gives out a more intense light than hydrogen.

Sulphuretted hydrogen has an extremely fetid smell, resembling that of putrid eggs. It is an impurity in coal gas, and is so deleterious to animal life, that a bird exposed to an atmosphere which contained only one part of the gas to fifteen hundred of atmospheric air, died instantly. This fact will be sufficient

to prove the importance of purifying coal-gas, for it cannot otherwise be burned without producing an atmosphere which is extremely unhealthy.

The advantages which have been gained by the introduction of coal-gas, are more numerous than can be imagined from a superficial view. If we had only obtained a strong and pleasant artificial light, and avoided the labour, inconvenience, and expense, which attended every previous method of lighting, its introduction would have been of great importance. But the subject may be placed on a much higher ground, when viewed in relation to the improvements which have been recently observed in the social and moral condition of society. The lighting of the public streets has given an efficiency to police establishments; and if it has not diminished vice, has made its exhibitions less frequent, and given a security to property which was not before enjoyed.

Among the advantages derived from the common introduction of gas, safety is not the least. There are persons, even in the present day, who continue to indulge prejudice, although evidence most conclusive has been long opposed to their fears. Gas is evidently a less dangerous artificial light than either lamps or candles, for there is no possibility of sparks being thrown out, and igniting the inflammable substances which may happen to be near. If there be not an almost wilful neglect, an accident from the use of gas is impossible; nor can it indeed occur at any time without an escape. The coal gas when ignited at a jet, burns with a steady flame; but when intermixed with atmospheric air, it becomes an explosive compound of a most dangerous character. Accidents which occur from this cause, are therefore, of a serious nature; and we, consequently, sometimes hear of buildings being almost destroyed. Many instances might, if necessary, be mentioned, but they are already too well known to our readers. If, however, they be severally traced to their origin, they will all be found to arise from some degree of culpable ignorance or neglect. Gas cannot escape without being known by its unpleasant smell; and should a light be introduced into a room containing a mixed and deleterious atmosphere, an explosion will probably be the result.

These general remarks will prepare the reader for the examination of the drawings, and enable him to understand the use and propriety of the several parts of the works which we have introduced in detail.

Plate XLVI.

Is the entrance elevation of a design for Gas Works, calculated to supply a town containing from seven to eight thousand inhabitants. In designing and constructing buildings for the manufacture of gas, it is of the greatest importance that the most simple as well as efficient principles should be adopted, for upon this will depend not only the economy with which the gas is produced, but also its purity and abundance.

The central building in the design or principal elevation, is the retort house; and the low buildings which range with it in the same front, are coal and coke sheds. Between this main building and the boundary wall, there is a large yard, as shown upon the ground plan, bounded on each side by necessary offices and a dwelling-house for the engineer; and these being brought out to range with the boundary wall, give a neat, finished, and handsome appearance to the design.

Plate XLVII.

Is the ground plan. There are three entrances to the building; one in the centre, by a pair of large folding gates, for carts, horses, and large materials or machinery used in the works, and one on each side for workmen and visitors. These severally conduct us into a large yard, and on the right is the residence of the engineer or manager, and on the left an office, waiting-room, and board-room. In the centre of the principal building is the retort-house, and on each side a shed, one of which is for coal and the other for coke. At the back of the retort house, or rather of the coke shed, is the pan of one gasometer, supposed to be in use. The dotted circles mark the situations where other gasometers may be suspended if required. From the hydraulic main the gas is conveyed into the condensing cistern A. B is a cistern for the reception of the coal tar and ammonia liquor. From the cistern A the gas is conveyed by pipes, shown by the dotted lines, into the purifying house C. D D are the purifying boxes. E is the gauge, or gas meter. By another line of pipes the gas is conveyed into the gasometer, or into the main which communicates with the town or building to be lighted. It will be here necessary to remark that the gasometer is only a reservoir, and serves no other purpose than that it enables the manufacturer to produce the fluid before it is absolutely required for use, but in the event of an accident the gas may be turned at once into the main without going into the reservoir at all,

though it must be at the same time remembered that it will then be under no pressure but that of the fluid itself, which must consequently be supplied in great abundance. The well near the gasometer contains the principal valve; and the dotted line from it, which is carried out of the yard, shows the direction of the main. The sheds on each side of the back yard will be found useful, not only for containing lime, but also various articles of machinery, pipes, and other things, and a workshop for the gas fitter is absolutely necessary.

Plate XLVIII.

Is a section and elevation. The retort house is shown longitudinally in section; the engineer's residence and the offices are represented in section transversely. The coal and coke sheds are shown in elevation. The windows of the store rooms, lime houses, and coal and coke sheds, may be of perforated zinc.

Plate XLIX.

In this plate a transverse section of the retort house is shown, and the elevation of the manager's residence. The gasometer is also represented, and the mode of suspending it. All our readers are aware that it works in a tank containing water, in which it rises or falls according to the quantity of gas contained. This excavation should be made perfectly water-tight, unless there be such springs in the ground as will constantly supply at all seasons of the year a sufficient amount of water.

Plate L.

In this plate the construction of the retorts and the mode of fitting them are shown.

Fig. 1. Is the elevation of the furnace, retorts, &c., in the retort house. A A is the hydraulic main. B B are the dip pipes. C C two retorts with the doors open. D D D three retorts with the doors closed. E the furnace door. F a stone or brick floor. G the ash-hole.

Fig. 2. Is the transverse section of the furnace and retorts as fixed in the oven, or in other words, it represents the appearance, supposing the front masonry to be removed. G is the ash-hole, which is bounded on each of the sides by a nine-inch wall. The intermediate space between these and the adjoining walls is filled with sand, which is used for the purpose of retaining the heat, it being a bad conductor of caloric. E is

the furnace. The retorts are supported, as will be seen in the drawing at *a a*, upon four-inch arches with metal supports. *b* is the outlet for the smoke, which is carried round the arch, and takes three returns. S is a stone covering, and the interval between it and the oven is filled with sand, for the purpose already explained.

Fig. 3. Is a longitudinal section of the furnace, retorts, flue, &c. G is the ash-hole. E the furnace. C the retorts, one of which is shown in section. B the dip pipe. A the hydraulic main. D the pipe leading to the condenser. This method of building the ovens, of fixing the retorts, and of constructing the flues, the author has adopted in many places, and can speak with certainty when he recommends the plan to others. He has no doubt in saying that the builder will find it highly advantageous to adopt the hints which have been here offered to him on these important subjects.

Plate LI. Details.

Fig. 1 is a perspective sketch of the condensing box, which is generally made of wood, but may be constructed of any other suitable material. The arrows show the circulation of the gas after leaving the hydraulic main, from one compartment to another, the object being to pass it through as great an extent of fluid as possible, so as to secure the condensation of all those substances which are thrown off in a state of vapour with the gas. The tar, ammonia, and other impurities thus condensed, are drawn off by the syphon A.

Fig. 2 is a perspective sketch of the purifying box.

Fig. 3 is a section of the same, showing the perforated shelves, over each of which dry lime is spread to the depth of about three inches.

Fig. 4 is the plan of one of the shelves.

Fig. 5 is the plan of the top of the box, which should be kept down in the water to the rim by a regulated pressure weight.

Fig. 6 is a perspective sketch of a portion of one of the retorts, showing the method of attaching the mouth-piece and fastening the door.

Fig. 7 is a sketch of the furnace door.

Fig. 8 is the crank by which it is lifted in and out of gear.

Fig. 9 is a section of the wrought metal roof and ventilator, which is drawn to scale, and will not, therefore, require any description.

DESIGN OF A MARKET-HOUSE FOR A SMALL TOWN.

We have already given a design for a market-house, but it was only suited for a town with a large population. As it is our principal object in this book to meet the public wants of communities, whether congregated in large or small numbers, it is desirable that we should furnish a design of less extent, and of more limited expense. No public building is of so much importance as a market, whether considered as a matter of convenience or of cleanliness. Small towns, also, are generally found in agricultural districts, and a suitable place is required for the periodical meetings of farmers, and the sale of their produce. The design we have here presented to our readers, has been prepared with a view to their accommodation, as well as the easy application of the building to generally useful purposes.

Markets, (which when held periodically at comparatively long intervals of time, were called fairs,) are of great antiquity, in this and in many other European countries. At a period when the principles of commerce were beginning to be understood, but when the trader did not possess the convenient modes of selling or buying he now enjoys, markets were indispensable. The country less thickly populated, and the means of communication less easy, it became necessary to establish periodical meetings for trade, and the market crosses still existing in some of our ancient provincial towns, are memorials of the times to which we refer. These markets, or fairs, were also sometimes established by the noble or powerful for the purposes of personal gain, or to enrich the ecclesiastics, and depress the merchants, who were gaining great wealth by their trades. In the time of Henry III., the citizens of London were looked on with great jealousy by the Court, and every means was adopted to impoverish them. They are tauntingly described as "calling themselves barons on account of their wealth;" and to diminish their gains and to enrich the abbot of Westminster, an annual fair was granted to him, to be held at Westminster at St. Edward's tide for fifteen days; "and to the end that the same should be more haunted with all manner of people, he (Henry) commanded by proclamation that all other fairs, as Elie, and such like, holden in that season, should not be kept, nor that any wares should be shewed within

the citie of London, either in shop or without; but that such as would sell should come for that time unto Westminster." As the liberties of the subject were extended, commerce was freed from the shackles by which it had been restrained, and the market being found an insufficient accommodation to the merchant, was left for occupation to those who deal in agricultural produce, and provision.

Plate LII.

This is the perspective view of a design for a Market-house, suitable for a small town. The market is intended to be held on the ground-floor, and over it is a large room which may be used as a court for magistrates, an exchange room, a place of assembly, or any purpose requiring a large space. At the same time, arrangements may be easily made for its division into a number of rooms by temporary partitions. One of the wing buildings may be used in part for an engine-house, and the other part for a police station or watch-house. The other wing building may be fitted up with stalls for a market, or otherwise appropriated as may be found most useful for the town. It is scarcely necessary to remark, that although we have endeavoured to give the most convenient arrangement for the several buildings we have designed, it is not to be expected that they will in all cases be found the most appropriate for the towns in which it is proposed to erect them. The architect or builder must, therefore, so modify them as to meet the wants of the locality.

Plate LIII.

Fig. 1, is the ground plan of the building. The central part is left open as a market for corn or any other produce. Adjoining it on one side, are the police and engine stations. The principal entrance to these, is at the end of the building, leading into a long and wide passage, in which two or more engines may be kept. To this part of the wing, there is also an entrance from the rooms appropriated to the engineers or fire brigade, and those occupied by the police. If a larger police establishment be required than is provided for in this arrangement, that which is shown in the other wing, will be found convenient. The principal entrance here, is at the end of the building, and leads into a hall, having a cell for prisoners on each

side. These cells should be fitted up with benches and a water closet. At the end of the entrance hall, is the door into a passage adjoining the inspector's office. The partition in the passage enclosing the inspector's office, should have a sliding sash; beneath which is fixed a desk, where the person sits who takes the charge. The other fittings for the office must consist of benches and closets. The two side entrances lead into passages, in which are fixed the stairs to the room on the first floor, and to the water closets and urinals.

If apartments should not be required for an engine and station house, the wings may be divided into separate stalls for the sale of articles of common consumption. Should this plan be adopted, it will be desirable to have portable stalls, so that the convenience of different persons renting them may be secured; and the space be rendered available for other purposes when no market is held.

In the middle of the market-house there should be a pump and cistern, for the use of persons who require water for their business, and also to insure the cleanliness of the building. If vaults should be introduced, and they are very desirable for the purpose of depositing the stalls and other moveable articles, they should be entered from doors in the floor of the market-house, or from the wings, if those parts of the building should be used for any purposes that admit of this arrangement.

Fig. 2 is another arrangement of a ground plan for the same building, in which the wings are appropriated for the use of the market, fitted up with stalls in different manners. In one of these we have shown the mode of obtaining convenient water closets and urinals, and also a staircase to the upper rooms. The passage through the building should be retained if possible, as it gives a readiness of access to every part, as each division will probably be appropriated to different kinds of merchandise.

Plate LIV.

Fig. 1 exhibits one-half of the large or exchange room, on the first floor, and one of the wings. The plan of the wing is intended to represent the mode in which it may be fitted up for use when the large room is used for public assemblies. We have supposed the room to be built for stalls, as shown in Fig. 2, Plate LXII., the stalls themselves being temporary

erections. Upon the removal of these, a portable boarded platform may be put down, and the several apartments made by moveable partitions.

Fig. 2 exhibits the mode of constructing the roof, and of finishing it. The roof may be covered with slates, zinc, or marine metal, as may be most convenient. The wing buildings, it will be observed, are intended to be lighted from above, which will be found in every respect the most convenient mode.

Fig. 3 is a transverse section of one-half of the central building, showing the exchange room, market, and vaults.

Fig. 4 is a transverse section of one-half of the wing buildings.

In both these sectional drawings the mode of construction is fully shown, and also the style of finishing the exchange room. The turrets at each end of the building are not merely intended as ornaments, but serve the general purposes of ventilation, or one may be used as a chimney for the exchange room, if a fire be considered desirable.

Fig. 5 is a section of the base of the pilasters, to a large scale.

Fig. 6 is the section of the cap of the pilasters.

Fig. 7 is the cornice of the exchange room.

Fig. 8 is the cornice of the wing buildings.

Fig. 9 is the cornice over the door heads.

Fig. 10 is the cornice of the principal building.

It is proposed to construct this building of bricks, and to execute the cornices, caps and bases of pilasters, and other ornamental parts, of stone. Should it be found impossible to obtain stone, they may be run in cement upon properly prepared brickwork. The rustic work at the end of the building, and the ornament above it, should also be of stone. The piers or pilasters supporting the fronts of the exchange room should be eighteen inches thick, and the brickwork above fourteen inches. The wing buildings should be fourteen inches thick in the piers, and nine inches in the panels. The market-house is intended to be sixteen feet high, and the exchange room twenty-two feet under the cove. The vaults under the principal building should be eight feet high to the springing.

A DESIGN FOR A COUNTRY CHURCH.

MANY excellent designs for Gothic churches on a large scale have been at various times published by architects, but we are not aware that much attention has been paid to the preparation of those suited for small rural parishes. In such situations, the architect should, in the first place, endeavour to suit his design to the limited sum to be expended, and to confine the size of the building to the absolute or expected wants of the locality; and in the next place, he should endeavour to secure a propriety in his design, suiting it to the scenery of the place in which it is to be erected. All persons seem to agree in the choice of Gothic, as the best style of architecture for a village church; and it is easy, we think, to discover the origin of this almost universal selection of the pointed architecture. There is a great harmony between the form and general characteristics of Gothic, and the scenes which every where meet the eye in the quiet retirement of a country village. But there is a still stronger motive for the adoption of the style, although less evident; it is the pleasing associations which may be acting in the mind, without even the knowledge of the individual. The rude peasant who has not, perhaps, even thought of the difference between the forms of the church in which he on every succeeding Sunday performs his accustomed worship, and the barn in which he on every other day labours for the subsistence of his family, is not an unprejudiced observer; for the sight of a church similar to that which in youth he called his own, or to that in which he now hears the words of truth, brings to his mind many scenes over which he delights to linger. To the man of education, there are other associations, besides those of a personal character, and which are connected with the warmest feelings of our nature. He reverts to the state of society when such buildings were first erected, the history, so far as it is known, of those who invented or improved the style, and a thousand historical facts and subjects of interest crowd upon his recollection. It is true, that similar associations may be called up by buildings in other styles of architecture, and yet how unlike! The thoughts of former greatness may be present in the mind, and the imagination may re-animate past scenes, but there will still be wanting that bond of union which is given by locality. They

were our ancestors who erected the building, who administered the sacraments, and performed the services, or who worshipped within its walls. Generation after generation appeared and decayed; habits, manners, and even the very face of nature, changed, but still the sacred pile remains a silent reprover of the vanities of life, still upholding on its pinnacles and spire the sacred emblem of eternal mercy. These are the associations which to the serious and reflecting mind of an Englishman, give an interest to Gothic architecture as the style best suited for ecclesiastical buildings.

Plate LV.

This is the perspective view of a design for a Country Church in the early English style, or in other words, the earliest period of Gothic architecture; and it is better adapted for such a purpose than any other style, on account of the simplicity of its details, and the appropriate neatness of its ornaments.

The lancet arch, which is one of the leading features of the early Gothic, made its appearance in England about the year 1135, towards the close of the reign of Stephen. Previous to this period the Norman architecture was in common use for ecclesiastical structures, and there is but little doubt that we are indebted to the Normans for this lighter and more elegant style, as well as that which bears their name. It is quite certain, we think, that the lancet arch was employed in Normandy as early as the year 1080, and in 1150 had completely superseded the round arch and its appropriate ornaments. We may, therefore, conclude that a period of about seventy years was occupied in bringing the style to perfection; and it would be interesting, were all or many of the buildings erected during that period of transition in existence, to trace the progressive advance of the art from the heavy and grand outline of the semi-circular arch, with its double and treble chevron, its festooned, crenelated, and billet, or, at a still later period, its beak and cat's-head mouldings, to the light and more elegant lancet style, with the trefoil head, bas-reliefs, and other sculptured enrichments.

The windows of the first period of Gothic architecture were narrow, long, and sharply pointed; and both on the exterior and interior were decorated with light shafts. Architectural writers generally refer to the window in the great transept of York Cathedral, which is fifty feet in height, and eight in width, as one of the finest, as well as the largest specimens in England.

The window in the south transept of Beverley Minster, and in the Chapter House at Oxford, may also be mentioned as fine examples.

Almost immediately after the introduction of the lancet arch, the trefoil, formed by a circle and two half circles, was adopted. "I have observed," says Mr. Dallaway, "no instance more perfect than in the Gallery of Ely, and that of the elder Lady Chapel in Bristol Cathedral, erected not later than 1170. The trefoil soon became much expanded, and the open quarterfoils, spreading into many halves or lesser portions of circles, were introduced, which terminated in bosses or flowers. These were either applied to the walls, more frequently in chapter houses, or to door cases deeply recessed, and each may be seen to great advantage in Lichfield Cathedral."

The style we have adopted in our design is stripped of all ornament, with a view to the saving of expense; and it will, we think, be evident, that great neatness and propriety may be secured in Gothic architecture without a large expenditure.

The spire is a very characteristic feature of a Gothic church. It was never used in the Norman buildings, and the steeple itself was so low that even in the latest examples it did not rise to a height of more than one square above the roof. When the pointed style was introduced, the tower was raised and a spire was added. It was at first made quite plain, but was afterwards more or less decorated as the ornamental work was increased.

Plate LVI.

This is the ground plan. On each side of the altar a small room is provided, one of which may be employed for a robing room, and one for general purposes. There are three entrances to the church, one in the principal or western front, and one on each side. At the western end seats are provided, for charity or Sunday-school children, and these may be raised one above the other, so as to bring them into the view of the clergyman and congregation. An organ may, if required, be introduced in the tower, and the circular staircase leading to the belfry can be used by the organist, or it would be easy to construct another and more convenient entrance. The body of the church is fitted up with pews, but it is probable that this arrangement may not be found altogether suitable, and may be altered to suit the convenience of the parish for whose use the building is erected.

Plate LVII.

Is partly a section, and partly an elevation, taken upon the line A B. One-half of the drawing is a section, and so clearly exhibits the construction of the building, that it is hardly necessary to make any remarks upon it. A concrete foundation has been introduced, but this may be omitted if found to be unnecessary. The walls being low need not be of great thickness, and the footings may be arranged in proportion. The roofs are simple in construction, but we would recommend to the builder the adoption of the method we have shown of forming a ceiling, which can be done at a comparatively trifling cost, and will be very appropriate to a small structure such as that we have presented to his notice.

The next part of this plate exhibits the construction of the steeple and spire, with a suitable clock floor and belfry. It is proposed to build the spire of wood, and the manner in which this can be done is shown in the elevation; but to assist the reader still further, we have given plans of two different parts.

Fig. 1. Is a plan of the tower at C.

Fig. 2. Is a plan of the tower at D.

In connexion with the section of the tower and spire we have given an elevation of part of the western front, and the side elevation of the porch on the southern side. Details suited for every part of this elevation may be collected from various parts of this book, and our work on Villa Architecture.

In speaking of the materials of which this building may be formed, should our design be carried into execution, we can only repeat what we have already stated in reference to other structures. If a suitable building stone cannot be procured at a moderate cost, we recommend the use of hard grey stocks of a uniform colour; for roman cement, especially in large masses, should be avoided as much as possible. The dressings to the doors and windows, and the other moulded or ornamental parts, should be of stone. The church may thus be constructed at a small cost, and will be in every respect better than one covered with cement, a substance which is subject to great injury from frost and other atmospheric changes.

A DESIGN FOR A MUSIC HALL OR PUBLIC ROOMS.

THERE are many towns in this country which, although inhabited by some families of distinction in wealth or education, requiring all the modern improvements for the enjoyment of public amusements as well as for the pursuit of intellectual and benevolent objects, are unable to support the establishments which in more populous places are considered necessary for the several objects. Assembly rooms, literary institutions, news rooms, music and temperance halls, may be found as distinct buildings in large towns, but in the smaller it is necessary to secure the advantages required by each and all the popular institutions of the day, in one. The design which we here present to the reader is intended for this purpose, and will, we think, be found suitable, from the character of the elevations, and the convenience of its arrangements.

Our design has been prepared chiefly with a view to musical performances. The English public have not long been acquainted with a means of securing occasional concerts and oratorios, and have consequently had but few opportunities of enjoying in public, the most delightful of all recreations—that of listening to good music. Foreigners have from this cause imagined that the British are not a musical people, and have invented many theories to account for the assumed fact. Some have thought that our climate is too cold and changeable, some that we are too much engaged in the accumulation of wealth, to find time for a pursuit which is not profitable in the commercial acceptation of the word. But those who imagine that we are as a nation destitute of the soul of music, are ignorant of our social constitution. The British nation is essentially domestic, and to know its character and habits the stranger must mix in the family circles of the middle classes; and if once admitted there, he will find a more correct appreciation of harmony and the works of genius than can be attributed to those who only find a similar enjoyment in public assemblies, amidst the glare and glitter of equipage and external circumstance. The public performance of music, however, is desirable, and buildings are in various large towns erected for the purpose; and could such buildings as that we have designed, useful for a variety of purposes, be erected in places of comparatively small population, the pleasure might be extended to the people in general.

Throughout this work we have adopted the plan of representing our designs in perspective, as giving the best possible view of the building as an entire structure. Those persons who are at all acquainted with architectural drawings, will be able from these to prepare the elevations. To assist him, however, in doing this, we have entered fully in the letter-press upon a description of the mode in which the building should be constructed, and the height of the several floors. This will be of great assistance to the draftsman, and enable him to prepare the elevations and sections which the nature of this work prevents us from giving, and which, indeed, cannot be considered necessary. The building which we have here presented to our readers, is one which a person at all acquainted with the art of construction, can have no difficulty in executing; but still a few remarks from us seem to be indispensably necessary.

Plate LVIII.

This is the perspective view of a design for Public Rooms or a Music-Hall in the Roman-Ionic style of architecture. We need hardly remark that in the execution of this, or any other of our designs, the character of the building, when completed, will depend upon the adoption of suitable proportions and details. These may of course be easily supplied by any person who has carefully studied the classical styles of architecture. For want of this necessary attention to detail, many designs, in themselves appropriate and even elegant, appear, when executed, ill-formed and abortive conceptions, and entail disgrace upon the persons who have been concerned in their production.

The roof of this building may be executed in cast metal, and the ventilator, which is seen in the perspective view, should be constructed of the same material. The columns, cornices, plinth, and all other embellishments, should be formed of stone if possible; but if this cannot be obtained, the builder will be compelled to use some kind of cement; but all cements should be avoided if a natural stone can be procured. The ready modes of communication between nearly all parts of the kingdom, will now, it is hoped, considerably reduce the price of building-stones, so that in any town a suitable material will be easily obtained; and this will be no unimportant advantage to the art of building, for although some cements form a good substitute for stone, none of them can be compared

in durability. The ceiling of the great hall is intended to be coved and formed into panels. Above the cornice, in the moulding of each panel, there should be openings to give the rarefied air a passage into the ventilator, through an inclined trough or tube, which may be inserted between the principals or bearers of the roof.

Plate LIX.

This is the ground plan of the building. Suppose a visitor to approach the building at the principal front, he will enter a hall sufficiently spacious for a building of the size, having on the left a porter's room, and on the right an office for a clerk or secretary. Ascending three steps at the end of the hall, he will come into a passage, which will, on either hand, lead him into a passage separating the principal and central room from those in the wings; but in the same front passage there are, on each side, stairs to the gallery of the large room or hall, between which there should be a handsome doorway. If these arrangements be made with appropriate taste, they will give an exceedingly pleasing appearance to the entrance: they are shown generally on the plan, but may be modified in construction according to the wish of the builder or proprietor. The central room or hall may be made available for many purposes. By the introduction of moveable seats it will serve as a music hall, and for this purpose, an orchestra should be erected, to which there should be stairs in the hall adjoining the back entrance. For a ball room, bazaar, dining room, or almost any other public purpose, it is equally applicable. As this is the principal room in the building, and is constructed to receive a number of persons, there should be a ready access to it from every side. This we have provided; for there are not only the back and front entrances, but others are introduced at the sides, which would be found convenient as allowing persons to leave the building without interfering with those who might be entering by the front and principal door. The entrances on the sides are intended to be lighted from above. The door on the left hand is connected with a refreshment room and ladies' retiring room; that on the right with a lecturer's or committee room, and a card room. In connexion with these, there are sufficient water closets and other convenient arrangements.

The stairs in both the front and back halls are continued into the basement.

The halls, passages, urinals, and some, if not all of the water-closets, should be paved with stone. All the rooms on this floor should be warmed and ventilated with hot air, and they should therefore be severally provided with suitable ventilators. The height of the smaller rooms should be eleven feet, and that of the hall forty feet. The gallery and orchestra should be elevated about fifteen feet above the floor of the room in which they are placed.

Plate LX.

On this plate we have exhibited two plans, one of half the basement, the other of half the upper portion of the hall and the rooms on the same level.

Fig. 1, is a half plan of the basement. In the left wing there are a kitchen, scullery, and larder; and in the right, living rooms for the domestics of the establishment.

The centre of the building should be appropriated to the warming and ventilating apparatus; gas works, if necessary, and the indispensable cellars and stores required for articles of common use. All the necessary water-closets for the domestics are introduced under the stairs. This floor should be paved with stone, and the height should be nine feet. It is hardly necessary to say that the drainage should be carefully provided for, in the arrangements for such a building.

Fig. 2, exhibits half the plan of the gallery or chamber story, with the flats, showing the position of the lights on the wing buildings. From the landing on this floor we enter the gallery, or the bed rooms appropriated for the attendants and servants of the establishment. Should it, however, be thought desirable, the necessary bed rooms might be formed in the basement, and a library, or any other room, be introduced on this floor.

The flats of the wing buildings may be covered with either slate, lead, marine metal, or zinc, according to the wish of the proprietors, or the extent of the funds within which the architect may feel himself bound to keep the outlay.

DESIGN FOR AN EXCHANGE.

In proportion as the commercial interests of a country are extended, the modes of performing the business are varied, so as to facilitate the interchange of property. In all commercial engagements, the parties concerned have one and the same object, personal advantage—gain. The pursuit of this object is calculated, at all times, to cramp the benevolent emotions of the human mind, and to create a selfishness of heart, extremely repulsive to the observer, and injurious to the moral character of the trader himself. When trade was more confined in its objects, and its pursuit was esteemed a reproach, the concentration of the feelings upon self was more marked, than now that it has a greater scope, and is able to confer the highest distinctions upon the successful. The merchant, manufacturer, or mechanic, is no longer the isolated being that he was a few centuries past, but is in some degree dependent upon the co-operation of others, which has no small influence in opening the sensibilities, and preventing the growth of that reserve and false show of poverty, by which in former ages, the merchant endeavoured to protect himself from the oppressions and robberies of the nobility.

The Exchange is to the merchant of the present day, what the fair was to his predecessor two or three centuries ago; and in comparing the past and the present, the merchant himself is not the least remarkable object. Our forefathers stood in a noisy promiscuous assemblage, endeavouring to make their sales by overstrained descriptions of the articles they had placed on their stalls, and by low art and cunning attracted the eye of those who seemed in any degree to require the merchandise they had for sale. Towards the poorer classes they exhibited a spirit of over-reaching, which might be called dishonesty; and towards the rich, a pitiful subjection of which the poorest shop-keepers of our own day would be ashamed. In danger of exactions from the court, and of insolence from the nobility, they were content to assume poverty, ignorance, and a mean, cowardly spirit, to protect their wealth, which was the only thing worthy of their pursuit. See the merchant now negotiating upon the Exchange, not only the produce of nations, but also fixing, with the independence of a man who is doing rather than receiving a favour, the terms upon which he will make loans for their support. Instead of being the subject of exaction, he becomes the exactor, and stipulates,

with a feeling nearly approaching to indifference, the only terms upon which he will consent to prop the falling resources of a government, or protect a nation from the invasion of its foes. The contrast is a singular one, but it is one which history gives us full authority to draw, that wealth has assumed a pre-eminence over every other distinction, for all others can be purchased by it. Not only do the poor reverence it, but the nobles pay it homage; and court, rather than avoid the company of those who have no other claim upon their regard. The establishment of the Exchange has tended to produce, with the freedom of our institutions, a great improvement in the character of our merchants, and has consequently aided them in gaining their present station in society. To the Exchange, negotiations of almost all kinds are brought, and by the assemblage of many individuals, engaged in different branches of trade, persons may be found who will purchase or sell any article according to the wish of those who have to dispose or buy. By this means time is saved, and the merchant is left, after the usual hours of business, free from all commercial engagements; so that by a successful business, which makes a comparatively small demand upon his time, he becomes possessed of that wealth which can alone purchase the elegances and luxuries of life.

Plate LXI.

This is a perspective view of a design for an Exchange, suited for a small commercial town, in the Ionic style of architecture. The dome, which is always expensive in erection, and rarely pleasing, except when of great magnitude, is in this design rejected; and the most desirable features retained by a circular erection, which would, it is believed, have an elegant appearance in construction. The entire building is simple in its outline, but would have a bold appearance, care being taken to secure the proper proportions, and it could be built at a comparatively small expense.

It is proposed in the erection of this design, to adopt a novel mode of lighting and ventilating. Looking at the circular erection from the interior, it would present a flat or coved ceiling, instead of the concave of a dome, if no object intervened between the summit of the lantern and the eye of the spectator. But it is proposed to introduce immediately above the part where the circular work commences, a horizontal metal light, as shown in Fig. 3, of Plate LXIII., with a glazed circle in the centre, of about six feet in

diameter. This circle may be glazed in the same manner as the other portion of the light; but must be so hung, that by means of cranks fixed to a self-regulating thermometer, it may open and shut according to the temperature of the room. It may, if thought desirable, be glazed with coloured glass; and if one rather larger, and hung in the opposite direction, be fixed above it, a beautiful play of lights would be produced. The fixed lights should, in this case, be glazed with stained glass in any ornamental design, consistent with the general character of the architecture of the building.

Round the upper portion of the lantern or circular erection, windows are introduced. To every other one of these, a metal rod is attached, which connects it with the ventilator; and by the means of cranks, the windows are made to open or shut as may be required. It is almost unnecessary to remark, that in the application of this mode of ventilation, all the acting parts must be of metal.

This building should be constructed of stone; but if the locality does not furnish one suited for the purpose at a moderate cost, uniformly-coloured grey stocks, or, still better, Suffolk bricks may be used for the plain surfaces of the walls, and the decorations be carved in stone. No rule, however, can be given, as we have frequently remarked, to guide the builder in the choice of materials;—it is a subject upon which he must exercise his own judgment, and upon which he from a knowledge of the locality can give a better opinion than any other person.

Plate LXII.

Fig. 1 is a half plan of the basement floor, the several parts of which are distinguished by letters. A, The stairs leading from the ground or principal floor to the basement. B, Urinals under the stairs. C C, A transverse passage, connecting all the rooms on the side of the building in which it is introduced; while those on the other side are intended to be united by a similar passage, a communication being formed from one to the other. D D, The porter or housekeeper's room. E, A room for general purposes, and would perhaps be conveniently appropriated as a store. F F F F, Water closets. G G, Rooms for hot-air apparatus, coals, &c.

Fig. 2 is a half plan of the ground or principal story. H H, The principal Exchange room. J, A retiring room for private business. K, The porter's room. L, Stairs leading to the basement, with water closets and urinals beneath.

Plate LXIII.

Fig. 1. This is a section of the circular erection above the roof, introduced in this design in place of a dome, exhibiting the windows, ventilators, connecting rods, and mode of finishing.

Fig. 2 is a half plan at the base of the circular work, taken on the line marked A on the section, and shows the timber or iron-work which supports the superstructure.

Fig. 3 is a half plan above the ventilator on the line B.

Fig. 4 is a half plan on the line C, and exhibits the principal support of the horizontal light and ventilator, which is suspended from it, in order that the shadows may not interfere with the effects of the lights.

Fig. 5 is a half plan on the line D, showing the application of the rods to the windows, which are intended to act with the ventilators by the suitable application of cranks.

Fig. 6 is a half plan on the line E, showing the timbering of the roof.

Fig. 7 is a half plan showing the covering and finishing of the roof.

Fig. 8 is a section of the bars and rollers of the lights and ventilators. A, is the light; B, the ventilator; C C C, stained or painted glass.

Fig. 9 is the elevation of the same.

Fig. 10 is a section of the bar of the light.

Fig. 11 is the elevation of the same.

Fig. 12 is a section of the head of the window and truss, with the cast metal light.

Fig. 13 is the elevation of the same.

Fig. 14 is a section of the cill, and the bottom of the cast metal light.

Fig. 15 is the elevation of the same.

Fig. 16 is the moulding round the base of the circle.

Fig. 17 is the cornice round the top of the circle.

DESIGN FOR A THEATRE.

The Drama has always been a favourite amusement among those people in any degree advanced in civilisation; and the erection of Theatres has therefore been an object of peculiar attention. Among the ruins of ancient cities, the theatres are, with the temples, the most prominent objects. Even in Petra, the long-lost capital of Edom, upon which the prophetic denunciation has been so signally fulfilled, the ruins of a theatre remain to this day. "In the bosom of the mountain," says Mr. Stephens, "hewn out of the solid rock, is a large theatre, circular in form, the pillars in front fallen, and containing thirty-three rows of seats, capable of containing more than three thousand persons. Above the corridor was a range of doors opening to the chambers in the rocks, the seats of the princes and wealthiest inhabitants of Petra, and not unlike a row of private boxes in a modern theatre." This was no doubt constructed when Petra had become the capital of a Roman province, although the city itself was in existence long before the formation of the Roman nation, and may even be traced back to Esau, "the father of Edom."

It is not an improbable supposition that the dramatic style of writing preceded all others. It is the style which most nearly resembles the ordinary method of communicating instruction by the voice—that of conversation. The oldest poems known to modern scholars are all full of dialogue; and many of them, even when of a didactic character, are thrown entirely into the conversational form. The book of Job, and many of the poems of the northern bards, are thus composed; and Homer and other poets might also be mentioned. The recitation of these poems constituted, in all probability, the first kind of dramatic representation. In its origin simple, and but little aided by art, it was still calculated to please; and by holding up nature to the view of the spectator, it became a favourite mode of communicating knowledge, and of exhibiting historical facts or the imaginations of poetry. When cities were established, places for the exhibition of dramatic compositions were erected; and among all nations the theatres became the places of common and constant resort. In eastern climes, and in countries of warmer temperature, and more equable atmosphere than our own, the theatres were built without roofs, of which we have a specimen in the ruins of the Coliseum at Rome.

In modern times, great changes have been made in the character and representations of dramatic writings; but they are still perused and listened to with the same interest as was felt by the Greeks and the Romans, when they crowded to the open theatres, which offered to all classes and every individual a never-tiring amusement.

That the character of dramatic writings has been much improved since the fifteenth and sixteenth century, cannot be doubted; but the alteration in the form of the theatre must not be spoken of with the same commendation. The boxes and galleries of a modern theatre may be adapted to keep up those distinctions necessary in such a state of society as that in which we live, and to meet the resources of those who frequent such places of amusement; but the effect is much less striking, and the convenience of the audience is less consulted, than in the theatres of the ancients, which were so formed that one seat rose above the other in succession, giving to every individual a perfect view of the stage, and yet admitting that separation of classes which was as necessary then as in the present day. In our design we have retained the form and arrangement usually given to such buildings, for prejudice is in such cases too powerful to be controlled by a feeling of expedience.

Plate LXIV.

This is the elevation of a design for a small theatre, suited for a provincial town. The Ionic style has been adopted, as it is at once elegant and attractive, affording a pleasing outline, and yet giving a stability of character absolutely required in all buildings intended for public purposes, and especially for those which are to contain a large number of persons. To determine the best mode of erecting the design, without knowing the locality, is impossible; for that which would be desirable in one situation, could not be adopted in another, without a great unnecessary expenditure. When a good stone can be procured at a reasonable cost, it should always be preferred; but in the majority of places this cannot be obtained on the spot, and the carriage from a distance becomes a serious item in the expense. The most available mode of construction, therefore, in most situations, will be to build of brick, facing with an uniformly-coloured grey stock; but in this case, the piers, columns, pilasters, cornices, the dressings of windows, and other ornamental work, should be executed in stone, or some durable cement.

Plate LXV.

Is the ground-plan of the building. In the front of the principal elevation there is a covered entrance, frequently, but improperly, called a piazza. This portion of the building gives boldness by the projection; and forms the basis for the columns, and the pediment they carry. The three central doors under the piazza lead into the lobby, A, intended for the use of those only who are going to or from the boxes, and as a waiting place for servants. From this the visitor passes, ascending three stairs, into an inner lobby, B, at the end of which is the staircase leading immediately to the boxes; and on each side there are desks (1, 1,) for the money-takers. On the left hand of the principal staircase, there is an entrance into the inner pit lobby, *c*. The passage D D is under the principal staircase, and may be approached from either of the inner lobbies, *c*, or *e*, by a descending staircase, introduced for the purpose of giving a sufficient head-way. By this arrangement a person may pass from the gallery to the pit, or from the pit to the boxes, by taking the proper tickets from the money-clerks in 2 or 3 box. The pit entrance is from the lobby, C, down the stairs, F. The gallery entrance is from E, and G is the staircase. At each side of this end of the pit, are the urinals (4, 4,) and the water-closets (5, 5.) H is a refreshment-room for the use of persons in the pit. J J is the pit.

The other end of the plan shows the arrangements under the stage and orchestra. A is the green room. B, ladies' dressing-room. C, gentlemen's dressing-room. D D, private dressing-rooms. E E, stairs leading to the stage and stage doors. The urinals (1, 1,) and water-closets (2, 2,) are readily distinguished.

This plan has been prepared with the intention of facilitating the arrangements generally adopted in the best-conducted theatres. In so small a plan it cannot be expected that all the convenient and spacious accommodations of a large theatre will be secured; but as far as possible they have been adopted; and it is believed that they would be sufficient, if the plan should be carried out without any alteration, for all the purposes of a provincial audience, and be fully satisfactory to the manager and the public.

Plate LXVI.

This is a plan of the saloon, boxes, and stage. A is the landing of the principal staircase, shown on the preceding plan. Here the staircase divides,

turning to the right and left. The side landings, B B, form the communication with the boxes, retiring-rooms, and saloon. C is the ladies' retiring-room, with a water-closet, and having a communication with the ante-room, D, which may be used as a cloak-room if thought desirable. E is the saloon, in which is a table for the sale of refreshments. F is the gentlemen's retiring-room, with water-closets and urinals attached. The ante-room, F, may be used as a cloak-room, in the same manner as the room D, on the opposite side. Water-closets and urinals are also provided from the aisle which surrounds the boxes. In the arrangement of the retiring and ante-rooms we have considered it necessary to form a ready communication from one to the other, which in some cases may be desirable, but that communication can be as readily closed. G G are the boxes, and H H the stage-boxes. I I are small iron circular stairs, communicating from the stage to the stage boxes. J the stage. K K the slides for the stage wings. L L are stair-cases from the apartments beneath the stage, and may be continued to the workshops and painting-rooms in the roof.

Plate LXVII.

This is the transverse section of the theatre, looking towards the stage, one-half showing the construction, and the other the finished building.

Fig. 1 is a half section, showing the construction. In this drawing, the smaller timbers are in many parts omitted, in order to exhibit the construction generally more distinctly than could otherwise have been done, and to prevent confusion. The panels at the top of the ceiling, as well as the ventilator in the roof, are intended to be filled with a fine wire gauze, to secure a perfect ventilation, which is, in all public buildings, one of the most important considerations.

Fig. 2 is a half section, showing the style of finishing the interior, but this may be altered in any way that is suggested by the proprietor, or to please the taste of the designer. Beneath the pit, and between the concrete foundations, cold air may be admitted through tubes and ventilators, but in the mode of ventilation the architect can follow any system which he thinks best adapted for the purpose.

DESIGN FOR A BAZAAR.

The present century has been characterised by a constant desire for novelty, which has been amply met by the stirring commercial enterprise and energy of the middle classes. This very desire for something new, has, in all probability, had its birth from the large capital and intelligence of a crowded population. The present condition of England will bear no comparison with that of any other country, but it is worthy of remark that exceeds every other in enterprise and industry as much as in population. The very number of the individuals who are seeking subsistence from their skill, intelligence, or capital, causes a competition, which, when confined within its legitimate bounds, produces a healthy excitement to the energies of individuals, and is beneficial to the public at large. New expedients, inventions, and discoveries, are constantly advancing society; novel and expeditious modes of transacting business are adopted, the intellect of the trader is quickened, and the consumer derives the benefit resulting from his activity and energy. When the population of a country is small, the trade is confined to a few persons, who are more anxious for large profits than extensive sales, the prices to the consumer are consequently higher than they should be; and this evil is increased by the independence of the trader and the wants of the purchaser. There is rarely any activity in business without competition, and without activity in individuals there can be no mercantile prosperity for a nation.

The evil in this country is that at certain periods, and under circumstances which may and do occasionally arise, the industry and capital of the country exceed the demand at home and the opportunities of sale abroad; and at such periods public distress is experienced. But the cause of this is to be sought in the artificial restrictions which governments attempt to throw around the industry of mankind, and the productiveness of nature, rather than in any necessary disorder, occasionally arising to a natural system of trading, and an interchange between nations of their surplus intellect and labour, or the united production of the mental and physical energy in the manufactured goods. Industry, above all other qualities of mind, must be allowed to walk unshackled, and in the path of its own choosing, and especially when, as in this country, it may lead the indi-

vidual to the highest positions in society, surround him with the luxuries of wealth, and crown him with the artificial distinctions of rank. When its onward course is unopposed, its effects upon society are in the highest degree beneficial; but when impediments are thrown in its way it turns into by-roads, and in evading or avoiding the stumbling-blocks created by governments, adopts expedients as greatly injurious to the public welfare and public morals.

We have been led into these general remarks by the subject of our present design — the Bazaar. There was a time when the man engaged in general traffic and the sale of miscellaneous articles of general use, took his station in fairs and places of common resort, in a stall or booth, travelling from place to place in a van, and calling the attention of the public, by successively offering different articles for sale, at prices which he affirmed to be cheap beyond all comparison. By these empirical means, he succeeded in obtaining purchasers, and in this rude manner obtained a precarious living. The bazaar of the present day, is like the common hawker's car, a migratory shop; but, in every other respect, differs from it, for as in the one there was the extreme of indifference to comfort and respectability, so in the other there is a regard to all that by its splendour can attract the eye and recommend the articles exposed for sale. The bazaar is one of those expedients adopted by the modern trader, in consequence of competition, and recommends itself to the public by its novelty and elegance.

In the construction of a bazaar, or at least of one which is established for fashionable seasons, it is sometimes of importance that it should be removable from one situation to another. In the accompanying design we have shown how this may be effected; and in other cases it will be easy for the builder to make such arrangements, when desirable, as shall enable the proprietor to remove his establishment at pleasure.

Plate LXVIII.

Fig. 1. Is the perspective view of a design for a Bazaar, which may be made either stationary or moveable. On the plan it is octagon, and may have one or more entrances, as shall be most convenient for the purposes of those who occupy it.

Fig. 2. Is a quarter plan, showing the external foundation of brickwork and the stones which receive the metal uprights.

Fig. 3. Is a quarter plan, showing the position of the uprights with their ties, and bearers for the floors.

Fig. 4. Is a quarter plan, showing the method of placing the joists on the iron-work. The boarding may be laid down in compartments, or in the usual mode, as most convenient.

Fig. 5. Is a ground plan, showing the manner of dividing the stalls and of arranging the interior generally.

Fig. 6. Is a quarter plan, showing the construction of the upper or first floor, on which the accommodation may be similar to that on the ground floor.

Fig. 7. Is a quarter plan of the naked flooring.

Fig. 8. Shows the arrangement of the aisles and stalls on the first floor, and the landing from the central staircase.

Fig. 9. Shows the mode of finishing the roof. The best mode would be to cover the roof with corrugated iron, which may be fixed to the cast metal by means of screws. The staircase and centre of the building are lighted by a lantern, which, together with the side windows, will give abundant light to every part.

The building is designed to contain about seventy stalls, which should be on an average, six feet square. In a permanent erection, water-closets, warming apparatus, and other conveniences, would be required, and might be provided in a central basement, to which access might be given by the same staircase which leads to the first floor.

Plate LXIX.—Details.

Fig. 1. Is a plan of one of the stone supports, showing the manner in which the iron uprights are bolted to it.

Fig. 2. Is an elevation of the same stone, with one of the uprights and a portion of the corrugated iron on each side.

Fig. 3. Is a section taken between the metal uprights, and showing the method of fixing the bottom iron on the external brick foundation.

Fig. 4. Is a plan of one of the doors.

Fig. 5. Is an elevation of the door with a portion of the corrugated iron on one side.

Fig. 6. Is a section of the door, with the steps and the mode of carrying them.

Fig. 7. Is a plan of the upper part of a metal upright, with the iron ties and wood joists, and the manner in which they are connected together.

Fig. 8. Is a section of the same, on the line A B of *fig.* 7.

Fig. 9. Is a section through the same, on the line C D of *fig.* 7.

Fig. 10. Is the external elevation of a part of the upright.

Fig. 11. Is an elevation of the cap of the upright.

Fig. 12. Is a half section of the same.

Fig. 13. Is a half plan of the central staircase, showing the method of fixing it on the brickwork, and of connecting it with the iron ties for the support of the joists.

Fig. 14. Is a section of the same.

Fig. 15. Is a section of the ties.

Fig. 16. Is a section of the roof.

Fig. 17. Is a section of the moulding for the upper part of the lantern.

Fig. 18. Is a section of the rail for the stairs.

Fig. 19. Is a section of the cap for the upper portion of the uprights.

It may perhaps, be worthy of remark, that the kind of bazaar contemplated in this design, is the one in which the stalls are let under specified conditions, to different parties dealing in various articles. In such an establishment, the building generally belongs to an individual or company, who have no interest in the trading, but make a profit simply as landlords. This is perhaps, the best mode of conducting such an establishment, as the competition which, within limits we have considered so desirable, is secured by the individual interests of all parties, and the public obtains that attention to its wants, which invariably secures a counter-benefit to the tradesman. Our design, however, is equally applicable for the use of a person who intends to become the salesman as well as the landlord; and by decreasing the number of stalls, a smaller number of assistants would be found sufficient to conduct the business.

A DESIGN FOR STABLES.

To obtain appropriate designs for the erection of stables, is almost as important as to secure the arrangements required for the residence of men. The horse is of greater value than any other animal, to the majority of mankind, being almost as indispensable to them in their works of necessity, as in administering to their comforts and luxuries; and is therefore always attended with a solicitude far exceeding that which is shown to any other of the brute creation. It is not the Arab, or wandering half-civilized man only, that esteems his horse as his companion, sharing his fatigues and his pleasures, delighting with him in the joyous exultations of nature, breathing with him the refreshing and invigorating air of morning and evening, and reposing with him under the shade of the forest, and by the margin of the stream, during the burning hours of noon; but the man of education and refinement participates in his feelings, and indulges the same sensibilities towards this noble animal. In his laborious occupations, in the sports of the field, in the hazards of war, the horse has a share, and at the same time alleviates his fatigue and danger. With an attachment to man almost enthusiastic, prodigal of his strength, and with an almost exhaustless energy of spirit, it dies in his service rather than shrink from the labour it is urged to perform. In return for these services, man makes provision for the horse, —suited to its habits—in no degree inferior to his own. By those who employ horses, whether for business or amusement, the erection of stables is a matter of great importance, and in their opinion will take precedence of even their own dwellings. After a day's labour on the road or in the field, the traveller or the sportsman first considers the animal that has carried him; and though exhausted by fatigue, neglects his own comfort until he has provided for his horse. Great attention having been from these causes paid to the construction of stables, a design will not be unacceptable to our readers. In it we have attempted to show the manner in which arrangements may be made for a number of horses and carriages, with rooms for the stable-keepers or grooms, and all the conveniences required for such an establishment. In the mode of construction some peculiarities are required, and these we have attempted to point out, as they are of general application, suited to those of small as well as large dimensions.

To those who have not been much interested in horses, and who have not been engaged in designing for stables, one or two general remarks, which are simply presented to the reader as hints, may be found useful. They are only intended to draw his attention to those subjects which he must well consider in his designs, and they may be said to point out the objects of study, rather than direct the student.

In external appearance, a stable should be simple and without ornament. We have seen buildings of this description most foolishly decorated, to resemble and even to outvie the residence to which they have been attached. But every building should be so designed that its exterior elevation may point out the object for which it was erected. A building is not to be considered in itself, or abstractedly, but in reference to the object for which it was built. A design which is highly decorous and even elegantly adapted for one purpose, may be for another as improper and grotesque. The careful architect will therefore first study the object, and to that appropriate his design.

The interior arrangements require much consideration. The stables are first to be provided with as many stalls for horses as are or may be required. In connexion with the stables there must be coach-houses, rooms for the grooms and stable-men, corn and hay-lofts, dung-pits, and other conveniences, according as they may be required by the circumstances of the case. The stables should be paved with bricks laid edge-ways; and great attention must be paid to the drainage, that the horses may stand dry. A supply of cold water is also indispensable; and in the best-arranged stables, hot baths are provided. This is an invaluable addition to a stable, and can easily be introduced when desired. The construction of a furnace and boiler with a means of letting the water into and out of the bath, need not be explained. We cannot too strongly insist upon the advantage to be gained from having horse-baths in connexion with stables, wherever arrangements can be made for their introduction. They are not only useful when a horse is suffering from epidemics, but also when brought home, fatigued and exhausted, from the work of the day. In the stables at Cumberland Lodge, in Windsor Great Park, connected with the establishment of the Master of the Buck-hounds, one was built a few years since, and has been found invaluable. Indeed it must always be considered, that the horse, being brought into a domesticated, and consequently artificial state, requires a mode of treatment not altogether unlike that adopted for man himself. This is the rule, and

the exceptions result from the difference between the constitutions and physical peculiarities of the two animals.

Hitherto there has been too great an indifference to cleanliness in the stables of this country; and the stable-keeper has acted as though he thought the accumulation of filth was advantageous to the health of the animals he is employed to attend. This foolish practice is now in a great measure corrected, and more attention is paid to cleanliness and ventilation. In various parts of this work we have suggested plans for the ventilation of buildings, some one of which ought to be adopted in every stable. A self-regulating ventilator is to be preferred, as this desirable and indispensable object is then permanently secured; and the evils arising from the negligence or indifference of servants are avoided. Whatever other arrangements may be dispensed with, the ventilation must not be disregarded: it is essential to the health of the horse, and at the same time it prevents the annoyance frequently arising from the erection of stables near a dwelling-house.

Plate LXX.

Fig. 1. Is an elevation of a coach-house and stables. Great inconvenience is experienced in the dwelling-houses of the higher classes of society from the modern practice of building the stables so near as to be offensive to both the sight and the smell. Hence it is that in the country attempts are made to hide these necessary buildings by planting trees before them. In the design we have offered to the public, all the business of the stable may be conducted within the walls of the building, which would rather form an ornamental object, than be in any degree displeasing. The stables, coach-house, harness, and coachman's rooms, are all included in the same building.

Fig. 2. Is the ground-plan. A, is the entrance. B, an area, which is groined, as shown by the dotted lines. C C, are stables, each of which will hold seven horses. D D, are the stalls. E E, mangers. F F, harness-rooms. G G, stairs to the rooms above. H, the coach-house.

Plate LXXI.

Fig. 1. Is the plan of the upper-floor. A A, staircases. B B, the landings. C C, rooms for the coachman and groom. D D, corn and hay-lofts. E E, trap-doors. F F, step-ladders, descending to the galleries, G G, which

are over the stables, and are found convenient for placing hay in the racks. H H, circular openings over each rack. I I, semicircular openings for light and ventilation. L, roof over coach-house. K, flat over entrance.

Fig. 2. Is the elevation of the principal or entrance gates. They are intended to be of cast metal, lined with one-and-a-quarter-inch boards, as explained in the description of the detail drawings.

Plate LXXII.—Details.

Fig. 1. Shows the method of applying the one-and-a-quarter-inch boards to the metal gates. A, the board. B, the metal. C, the method of matching inside the gates. D, the bottom style of the gate. E, the method of fixing the steel pivots into the stone for the gate to revolve on: this plan is much preferable to hinges.

Fig. 2. Is an elevation of a portion of the gates. A, the wood-linings. B, the boss of the pivot.

Fig. 3. Is a section of the top part of the gate.

Fig. 4. Is an elevation of the same.

Figs. 5, 6, and 7. Show other methods of fixing the upper pivot.

Fig. 8. Is a section of a part of a wooden gate, framed in the usual manner, with a method of working it on a centre. A, the door. B, the pivot.

Fig. 9. Is an elevation of the same.

Fig. 10. Is a plan of the same. B, the gate. C C, the iron shoe. D, the pivot. A, the iron jamb.

DESIGN FOR A HOSPITAL.

If there be one circumstance more than another of which an Englishman may be allowed to boast as peculiarly distinguishing his native country, it is the number and variety of the public charities. Pauperism is, in fact, justly discouraged; but, at the same time, the wretched and diseased victims of want are not left to perish in the streets without assistance. These institutions, however, are not sufficiently numerous, and the efficiency of many of them is too much restricted by the provisions thrown around them, to meet cases of imposture which may occur. The really deserving, or at least, the really needing object of charity, is thus sometimes refused, and suffers the extreme of want and wretchedness, because the superintendents of public institutions wish to prevent the impositions which may occur, or because the hearts of the paid distributors of charity are hardened, by constant intercourse with want in all its multifarious phases. Such imperfections, however, must necessarily attend every human institution, and is rather an argument in favour of their increase, than of their inefficiency.

But of all public charities, none have a greater claim upon our support than hospitals, which are for the most part, founded upon the broadest principles of benevolence, and receive any patient who may be presented, without regard to the narrow distinction of parochial residence, age, sex, or country. In every county, and in almost every large town in this kingdom, these invaluable institutions have now been formed; and their active operation has tended to relieve distress under the most trying circumstances in which humanity can be placed. Our book would therefore have been singularly defective, if a design for a hospital had not been found among the public buildings.

In the erection of a hospital two things are especially important,—a convenient arrangement of the apartments required for the several purposes, and a sufficient ventilation. The external appearance should be simple and without ornament, or at least, with no other ornament than is suited to the purpose for which the building is erected. The internal finishings should be in the simplest style, and be adopted with a view to cleanliness, which in such a structure, is indispensable for the restoration of the patients to health, and for the comfort of all persons who have the management of

the institution, or the superintendence of the wards. In the arrangement of the rooms, care must be taken to separate the patients according to the nature of the diseases under which they suffer, and to give separate entrances. By attention to this suggestion, much inconvenience may be avoided, and the repose of the patients, so important as an assistant to medical agents, will be better secured. Ventilation, which cannot be neglected in any structure, and especially one where a number of individuals reside, becomes of momentous importance when those individuals are suffering from disease. Other circumstances of detail and convenience will suggest themselves to the mind of the architect.

Plate LXXIII.

This is the perspective view of a design for a Hospital in the classical style of architecture, and is such an one as would perhaps be found suitable for a large manufacturing town, or for a county. It is proposed to divide the building into two departments, one of which shall be appropriated for the use of male patients, and the other for females.

As the basement story is not shown on the plan, it may be necessary to remark that it is intended to contain the washing and ventilating apparatus; the kitchen and the offices attached to it, dining rooms, and all other apartments required for the use of the servants of the establishment. Arrangements may also be very properly made for hot and cold baths. This story should be ten feet in height. The entire building is intended to be surrounded by an area seven feet in width, to which there is access from each side and at the back of the building. In the erection of the building a union of brick and stone will probably be found the most available materials; the latter being used for the quoins, cornices, pilasters, copings, and all ornamental parts.

Plate LXXIV.

Fig. 1. A half-plan of the ground floor. In a work of this description it is impossible to give all the drawings in full, required for construction, as the plates are necessarily limited. We have therefore in this and the following plate been compelled to introduce two plans upon one, and two sections upon the other. *Fig.* 1 of the plan now under consideration

exhibits that half of the ground floor which constitutes the men's side of the hospital. A, is the entrance or principal passage. B, the porter's room. C, the porter's bedroom. D, the hall or gallery. E, the doctor's dispensing room. F, the doctor's private room. G G, the principal staircases. H, the physician's room. I, waiting room for out-door patients. K, the accident ward. *a*, the nurse's room, *b b*, urinals and water closets. L L, passages. M, the theatre for operations. N, the operator's room. O O, rooms for pupils. Q, a back staircase to the first-floor rooms. *c c*, urinals and water closets. The passages throughout the building ought not to be less than six feet in width, not only to give ample accommodation, but to secure a sufficient circulation of air. The height of the rooms should be fifteen feet. A system of ventilation may easily be arranged through the ceilings, and between the joists, into the external atmosphere; and as the centre of the building is open, and the passages long, a good current of air will be produced, and a perfect ventilation, the importance of which cannot be over-rated, will be secured.

Fig. 2. Is the half-plan of the first floor on the women's side. 1, is the principal staircase. 2, the gallery. 3, Board or committee room. 4 and 5, retiring rooms. 6 6, nurses' rooms. 7, the large or principal ward. 8, washing closet. 9 9, water closets. 10, nurse's room. On the other half of the plan similar wards and nurses' rooms are to be provided; and also apartments for the resident surgeon or keeper, a consulting room, and a ward for children.

The second floor may be divided into wards for fevers, and contagious disorders of all kinds, which may be effectually separated from every other part of the establishment. On the same floor, but without any communication, bed-rooms may be provided for the domestics of the establishment.

The hall and theatre must be lighted from above; and as there is a considerable open space in the halls, from the basement to the top of the building, and as the windows upon the principal staircases are large and opposite each other, a complete ventilation will be the result.

Plate LXXV.

Fig. 1. Is a half section through the stairs and gallery, taken upon the line A, shown on the ground plan, and fully exhibits the construction of the building.

Fig. 2. Is a half section taken through the theatre, passages, women's ward and kitchen. The modes of lighting the theatre, and of ventilating the building, are shown on this drawing.

Plate LXXVI.—Details.

Fig. 1. Is a portion of the plan of the principal stairs, which should be constructed in the most simple and substantial manner, with an easy ascent. A six-inch rise and twelve-inch tread, will be found convenient. All decoration should be avoided. The bearing on the wall is shown in this plan.

Fig. 2. Is the front elevation of the same.

Fig. 3. Is the side elevation, showing the hand-rail and balusters.

Fig. 4. Is a section of the hand-rail with the baluster attached.

Fig. 5. Is a section of the iron girders to a small scale, intended to be used for the support of the stone landings of the staircases.

Fig. 6. Is a portion of the plan for the lights over the hall or gallery.

Fig. 7. Is a section and inside elevation of the same.

Fig. 8. Is a plan of one the stanchions and lights to a large scale. These lights are intended to be suspended on pivots. A. The sash frame. B B. Styles of the sashes, which are suspended on pivots, and are made to open and close by means of a self-acting ventilator, fixed in the roof of the lantern-light, and acting by cranks attached to a thermometer.

Fig. 9. The cap of the pilasters and antæ.

Fig. 10. Base of the same.

Fig. 11. Section of the principal cornice.

Fig. 12. Section of the cornice of attic.

Fig. 13. Cap of pilaster of the same.

Fig. 14. Section of the coping on the side-wing over the brickwork.

Fig. 15. Cap to the circular pedestals at the steps to the front entrance.

Fig. 17. Cornice round the theatre.

Fig. 18. The cap of the iron columns round the gallery.

DESIGN FOR A SUSPENSION BRIDGE.

The suspension bridge is admirably adapted for a variety of situations in which a bridge of ordinary construction cannot be employed, being recommended by its lightness, elegance, and cheapness. This beautiful construction may be said to have had its type in the rude rope bridges formed in many places by the peasantry to facilitate the intercourse between mountainous districts, over chasms and torrents; of which several interesting examples have been given by modern travellers. The suspension bridge, however, is a much more elaborate, though apparently an equally simple construction; and from its first introduction to the present period, it has received much attention from scientific architects and engineers. The finest structure in this country is the Menai bridge, erected from the drawings of Mr. Telford, and in no instance was the skill and ingenuity of that great man better exhibited, although from the accidents which have occurred, it is evident that the principle adopted was not perfect.

We need scarcely remark, that a suspension bridge is a platform suspended from a chain or rope, supported at each end by piers, and falling into a curve between those two points. It is, in fact, a reversion of the common principle of bridge building, the arch being inverted, and formed of a flexible material, instead of one that is rigid and immovable. The curve usually adopted for the chain, is that denominated the catenary, which is the position of equilibrium in a rope or chain suspended freely between two points, and formed by its own weight. As the security and stability of the bridge must in a great measure depend upon the adoption of a proper curve for the chain, it is of the greatest importance that a suitable one should be employed. Mr. Dredge, a gentleman who has paid considerable attention to the subject, doubts the propriety of the catenary, and it will not be unadvisable to state his objections from a paper, which, though published anonymously, is supposed to be from his pen.

"The position of perfect equilibrium is, from the very nature of the case, the position of perfect instability; because that which is in equilibrio, is under the government of no one controlling force. It is true, that as all matter gravitates, there must be two forces in order to sustain the position of equilibrium, and those forces must be exactly equal, and exerted opposite to each

other, in the direction of the same right line, and consequently in the same right line with each other. Let us apply this general principle to a chain in the form of a catenary, and making part of a suspension bridge. The one force is the weight or gravitation of the chain acting in a straight line to the centre of the earth, or as it may be taken at any part of the catenary acting in a plain coincident with this straight line, and extending the whole length of the ordinate of the chain. The opposing force, which just balances this in the case of the catenary, is the tension or power of resistance of the chains, the different parts being resolved into a resultant, which is directly opposite to the direction of gravitation, and counteracts it; and it is perfectly evident from what has been stated, that although these two forces produce the state of equilibrium by their opposite action, the substance is no more under the control of one of them, than it is under the control of the other; therefore the least force applied in a direction different from these, will produce motion in the body, or piece of matter."

Such is the principle of the catenary, the curve in which the chain is usually fixed, and the very equilibrium which it gives is, according to Mr. Dredge, a source of destruction, and his reasoning is worthy of the most careful consideration. Suppose now, that by the action of the wind, or any other force, the catenary is pressed on one side, and because it is in equilibrio, the least force will bend it a little way in this direction. By this means, the position of the line of gravitation is shifted by a small angle, whose vertex is in the centre of gravity of the earth. This is a vibration in one way, and the line of tension which has been bent from its true position, re-acts, acquires some momentum in re-acting, and the catenary completes its oscillation by a little advance toward the side upon which it is taken by the wind. But the oscillations are not perfect ones, extending to equal distances on both sides of the perpendicular, as is the case with the oscillations of a pendulum. The wind meets and resists the returning catenary, making the vibrations to windward much smaller than those to leeward; and if the wind is strong, and the catenary of great length and freely exposed, the whole vibrations where the gust tells, are to the leeward of the plane of equilibrium. This produces a sort of struggle between the different parts of the chain, as well as between the force of the wind, and the tendency to vibrate to windward; and the result consists of some very curious and complicated motions, such as the serpent-like twining of the chain if nothing is suspended to it, and undulations in whatever may be so suspended. If bracing, brace chains, or any other con-

trivances are introduced to steady that which is suspended—the roadway of a suspension bridge, for instance, the result is a greater contortion of the parts; and if the chains are of great length and strength, and the wind violent, the fracture of the suspending rods, and disruption of the roadway, must be the consequence.

To correct these evils, it is proposed that the curve should not be so deep as the catenary, for as we rise above that curve, the tension becomes greater than the gravitation. For the mode in which this is carried into execution, the lessening of the chains towards the centre, and the appropriation of the weights upon the roadway, we must refer the reader to the works of Mr. Dredge.

The general construction of a suspension bridge is sufficiently shown upon the accompanying drawings, to make it unnecessary to do more than describe the several parts in our usual manner.

Plate LXXVII.

This is the perspective view of a design for a suspension bridge supposed to have a span of sixty feet. The suspension rods are supposed to be about one inch and three eighths in diameter, and are fastened together by bolts and clips, of a construction which will allow for the ordinary expansion and contraction. The foundations of the piers in our design, are piled, and upon the piles we have shown two tiers of oak plank crossing each other. Upon the planks, York landing is supposed to be bedded, and from this the superstructure rises as shown in the elevation and section.

In the section is shown the construction for holding and winding the chains, and as these support every other part of the bridge, great strength is required. It is also important, that in the place where the chains are attached, there should be an excavation which should be arched over, either in one or two arches, so that there may be an easy access at any time to the attachments. The approach to this part may be by a door under the arch in the side of the pier, either by a ladder or circular stairs.

It may be desirable to remark that in the drawings we have supposed the foundations to be bad, and to require piling, in order to show how this difficulty is to be met when it happens in practice. The embankments we have supposed to be good, as our design is only intended to illustrate the mode of

constructing a suspension bridge, and not to explain the formation of earth work, which must vary considerably according to circumstances.

Of the design itself, little can be said—it is simple and massive, giving an idea of strength and durability. The suspension bridge is at all times, more or less apparently destitute of these qualities, and it is therefore the more necessary to obtain, as far as possible, a design in which they shall be the prominent features. In all bridges, viaducts, and works of the same character, simplicity of design must be studied, and broad surfaces should be retained in preference to a minuteness of detail, which, diminishes the appearance of strength. We have a great objection to the ornamenting of the piers and abutments of such structures, with columns and other architectural ornaments; for they are utterly out of place, and are introduced for the mere purpose of display, and diminish, rather than add to the strength of the structure.

Plate LXXVIII.—Details.

Fig. 1. Is a half plan showing a part of the bridge and the timbers necessary to secure the chains of suspension.

Fig. 2. Is the half plan taken above the parapet, showing the finishings.

Fig. 3. Is a half section showing the piles, the foundation and the construction of the superstructure. *a a*, are the piles, and they are driven close together, as shown by the dotted lines on the plan, and then covered with two tiers of oak plank, six inches in thickness.

Fig. 4. Is an elevation of the pier, and a section of the roadway.

Fig. 5. Is a plan of the clips for securing and uniting the rods of suspension.

Fig. 6. Is the elevation of the clip.

Fig. 7. Is the side elevation or section of the same. It will be easily perceived, that by this mode of connecting the suspension rods, the contraction and expansion of the rods are provided for.

Fig. 8. This is a section of the clips attached to the vertical rods, and secure the iron bearers *a a*, which run the whole length of the bridge, and support the roadway.

Fig. 9. Is the elevation of the same clip as it would appear externally.

All these details are drawn to a scale of three quarters of an inch to a foot.

Fig. 10. Is a design for the cast iron palisading on each side of the bridge.

DESIGN FOR A MAUSOLEUM.

Among all nations great attention has been paid to the burial of the dead, and it was considered an act of impiety to neglect those funeral rites which custom had sanctioned. If we turn to the earliest periods in the history of man, we find that this regard for the remains of the deceased, dictated in many instances an expensive, and always a careful disposal of the bodies of the dead; for in countries occupied by nations and tribes which have long ceased to exist, and of which we have no accurate written record,—whether in a state of barbarism or civilization,—an enduring evidence of their habits and customs is found in the sepulchral remains. Some nations have burned their dead, and deposited the ashes in urns; and from the style of art displayed in the construction of those vessels, and the character of the memorials by which their situation is pointed out, the antiquary is often able to gather much valuable information as to the general condition of the people whose mortal remains they contain. By other nations, simple inhumation has been practised, and with the body of the deceased, were frequently buried the arms he used, and the things in which he most delighted. The discovery of these, immediately informs us of the social condition of the people at the period when the burial took place, and they become, in the hands of the antiquary, invaluable commentaries upon the hints and conjectures of the ancient historians. Did the limits of this essay permit, many instances of the value of sepulchral remains in illustrating history, might be mentioned; but we will take two examples, the one from Egypt, the other from our own country.

The ancient sepulchral remains of Egypt, are of the most expensive and gigantic character. Tombs excavated in rocks, and vast pyramidal structures, are the resting places of the monarchs and nobles of ancient Egypt. The formation of these, and the paintings with which they are decorated, clearly point out a people in an advanced stage of civilization, possessing many of the refinements of luxury, but still as evidently destitute of that social relation of the varied ranks in society which mark the highest degree of national refinement. History is no inconsiderable assistance in our attempt to discover the condition of this people, and as we stand gazing with wonder and delight upon the massive piles, a painful imagination of the servitude and hard bondage of the multitudes who raised the gigantic structure, is forced upon our minds.

The Egyptians, we know, were in precisely that state which might be

conjectured from their monumental remains, without regard to history. Not only did the Israelites serve under them in the capacity of slaves, but the mass of the people themselves suffered under task-masters so rigorous, that their condition was slavery in all but the name. The arts, however, were encouraged, and had consequently advanced to a higher state than among many other contemporary nations. History is therefore, in this instance, confirmed and illustrated by what remains of their sepulchres, and by the study of both a tolerably correct picture may be drawn of their national habits and peculiarities of custom.

The accounts which have been left us of the Celtic tribes that first occupied the isles of Britain, are extremely meagre, and considering the national character and relative conditions of the historians, must be received with caution, if not with distrust. Scarcely any of their works remain, except a few massive stones supposed to be connected with their worship, and the mounds of earth piled over the bodies of the dead. Upon opening these, however, urns of various styles of workmanship, containing the ashes of the human body, and some ornaments and weapons, are found, which evidently point out the rude, half-civilized condition of the people; but at the same time indisputably prove, by the improvement in art so evident on comparing different specimens, that they were in a state of intellectual and social advancement, long before the Romans, by the conquest of the island, introduced their arts and customs.

This regard for the decent disposal of the bodies of the dead, may be traced to a universal acknowledgment of the immortality of the soul, and a belief in a future state. These all-important principles, which are so conservative in their influence upon social order, were but partially understood; for until the establishment of Christianity, they were seen by a defective vision, and appeared in a distorted form. By the new dispensation they are brought more fully into view, and are more accurately perceived, and in connexion with the great doctrine of the resurrection, invest even the broken relic of our mortality, lifeless and destructible as it is rendered by the hand of death, with an interest far greater than was ever imagined by heathen philosophy, or taught by the patriarchal code. The mausoleum is, therefore, to the Christian, emphatically the place of hope, the vantage ground from which he views the future, and upon which he may well record the conquest he will gain over death, in the re-assumption of a body as incorruptible in its nature, as it will be glorious in its attributes.

Plate LXXIX.

This is the perspective view of a design for a Mausoleum in the Tudor style of architecture. Compared with the architecture of the various cemeteries near London and other large towns in this country, it will appear an unornamental and very modest structure. It is, however, one which in its general characteristics is suited to the purpose for which it is to be employed. In its external features, it may convey a notion of its uses, and in the interior it would have that solemnity of appearance, and adjustment of lights, harmonizing with the feelings of those who entered it for the purpose of performing the last solemn duties to those with whom they had on earth parted for ever.

In endeavouring to establish a cemetery, the first thing is to select a suitable piece of ground of a rectangular shape. Some attention must be paid to the character of the soil; it should be one quite impervious to water, and in itself dry. A good system of surface-draining will then be required to make it in every respect suitable for a burying-ground. Such a piece of ground being enclosed by a wall, a portion may be appropriated for graves, and a portion for vaults. Suitable buildings will also be required for the performance of religious services. The building we have designed is raised upon a terrace, and is approached by a flight of steps. Elevation is thus given to the structure, and an imposing appearance, frequently lost by allowing a building to rise too evidently out of the ground. Upon entering the mausoleum, there may be supposed to be, on the right, a flight of stairs leading to the catacombs, intended for the undertaker's assistants and others engaged in the burial, and one on the left for the mourners. Immediately facing the entrance there is a platform or bier on which the coffin is placed, and this may be lowered by machinery. The importance of some such arrangement those only can appreciate who have had, when watching the progress of some beloved friend to his last home, their feelings harrowed by the manner in which the coffin has been from necessity or carelessness tilted upon the head or side. Men, whose trade it is to bury the dead, and who grow rich by the impositions they can make upon the pocket when the heart is broken and the ordinary feelings of prudence and carefulness are asleep, are so accustomed to scenes of heart-rending grief, and to the sad spectacle of mortality, that they have but little sympathy with the broken-hearted distress they so often witness; and the only safety of the public against a display of their indifference is to lessen their opportunities of wounding the feelings of those whom they attend in the solemn rites of burial.

The pulpit and reading desk are placed behind the bier, having on the right a robing room, and on the left a room for secular and general purposes, each with a door leading to the grounds at the back of the building. On each side of the middle aisle there are seats for the congregation, and immediately over the entrance an organ loft and singing gallery may be provided. A bell may be fixed in the turret of the gable end over the principal entrance.

Plate LXXX.

Fig. 1. Is the transverse section of one-half the building, showing the construction of the vaults and the chapel.

Fig. 2. Is a transverse section of one-half the building, showing the style of finishing.

We may in the explanation of this plate first draw the attention of the reader to an arrangement in the basement, in the centre of the building, at A. This is a shaft for the introduction of air, derived from an inclined external tunne with which it is supposed to be connected. Over the vertical shaft is placed a self-regulating ventilator. By this arrangement a sufficient current of air is made to circulate through the vaults and catacombs. B is a moveable stage upon which the coffin is lowered from the chapel into the vaults. C C are the catacombs. D D the doors at the end of the building. E the door into the catacombs under the terrace.

Upon the ground floor the seats are shown at A. B is the clerk's desk. C the pulpit. D the robing or clerk's room. E a horizontal ornamental ventilator placed immediately under the lantern light. F, lights in the lantern to be fitted in with finely perforated zinc or gauze wire.

Plate LXXXI.—Details.

Fig. 1. Is a half-plan showing the roof in a finished state, with the gutters, parapets, buttresses, and lantern light.

Fig. 2. Is a half-plan showing the timbers of the roof, and the metal bearers which support the lantern light.

Fig. 3. Is a half-plan of the lantern light in a finished state.

Fig. 4. Is a half-plan of the same showing the construction.

Fig. 5. Is the principal moulding.

Fig. 6. Is the saddle back, or coping for gable ends, &c.

Fig. 7. Is the principal plinth moulding.

Fig. 8. Is the moulding of plinth and pier of terrace.

DESIGN FOR A WORKHOUSE.

It is not the business of the author in such a work as this, to discuss the merits or faults of the Poor-law Act, and any such attempt would justly meet with not only the disapproval, but the censure of the reader. In our own time, a large number of workhouses have unfortunately been required, and architects have been desired to provide plans for their erection. Whether the system which rendered such structures necessary, be in itself wise, or whether it presses heavily and unjustly on the poor, we do not stop to inquire; every man must have formed his own opinion upon the subject, and with that it is not either necessary or proper we should interfere. The architect must provide such buildings as are required, without disputing as to the propriety of their erection. It is not, however, improper that we should state what class of building should be constructed, and what provision ought to be made for the inmates. To these subjects our remarks will be strictly confined.

All buildings, whether for the residence of the nobleman, or the parish pauper, should be so constructed as to give the greatest possible amount of comfort, consistent with the circumstances of those persons who are to occupy them. This is, without doubt, the fundamental principle in architectural design, which cannot, under any circumstances, be invaded, without entirely destroying the object of architecture as a useful art. In the erection of workhouses, however, this principle seems to have been very commonly forgotten, or purposely evaded; for they more resemble buildings constructed to receive those who have rendered themselves unfit for society by crime, and who have to receive the punishment enforced by the violated law, than those whose poverty is their only fault—who, after struggling in vain with misfortune and want, seek the refuge which the laws of the country have provided for those who need such succour and protection. Judging from the appearance of the majority of the houses erected under the powers of the Poor Law Act, it would seem as if their architects had provided buildings as repulsive as possible in their external appearance, and as inconvenient in their internal arrangements. The windows are few in number, and raised above that height in which they become useful to the inmates for the view they offer of the smiling country, and the active life of those who find subsistence in culti-

vating, or pleasure in viewing it. The heavens are the only object visible in these prison-like buildings, and the view of that is so much abridged, one might imagine the sun and bright sky were not made to bless the eye, and cheer the heart of the parish pauper. All architectural design has been at the same time abandoned in these wretched structures, so that the very sight of them hangs heavily on the heart, and banishes from the mind the delightful thoughts of liberty and repose, otherwise so inseparably connected with a beautiful country as England.

In internal arrangements, these buildings are equally defective, from the restrictions which they so evidently impose, and the want of attention to the comforts of the inmates.

A house of refuge for the poor should, on the other hand, be cheerful and pleasant in its external character, and should impress those who view it with an idea of comfort and retirement. He is but little acquainted with the varying conditions of human life, who does not know that no prudential forethought,—no exercise of skill and industry, can protect him from poverty; and when the heart is so bowed down with adversity as to seek from the state that subsistence which he is unable by personal exertion to gain, the relief required should be given, not grudgingly, but with a liberal and cheerful hand. Arrangements should be made to relieve the minds of the poor from their sorrows, and to lighten, rather than increase, the recollection of dependence which cannot be altogether removed from a well-constituted mind, whatever may have been the individual's former rank in society. In one word, then, all that is necessary for the poor when supporting themselves by their own labour, ought to be provided for those who are compelled to demand support in the poor-house.

Plate LXXXII.

This plate is a bird's-eye perspective view of a design for a workhouse, taken from an angle of the building. It is simple and inexpensive in design, as all such structures should be, and at the same time possesses every arrangement for the comfort of the inmates, that can be required.

In all buildings intended for the reception of a number of persons, the residence of the superintendent, master, or keeper, should be so constructed, that he may at all times have the immediate inspection of every part of the establishment. By the plan we have adopted, this is secured, for the resi-

dences of the master and mistress are placed in the centre, and are made of an octagonal form, each side looking into one of the yards, so that by a removal from one room to another, or from one part to another, the whole of the establishment comes under his view. The necessity of some such arrangement will be at once perceived by every reader, but its value can only be known by those who have had an opportunity of observing the difficulties to be overcome in maintaining order without severity, in an establishment where large numbers of persons are congregated, and living together. Misfortune claims a delicacy of relief from every heart alive to the common sympathies of our nature; nor can we believe that any person would be induced to treat the inmates of our poor-houses in any other manner, if they were the refuge of the indigent alone. But with them there are always many indolent and vicious, who can only be controlled by a more rigorous discipline than would be necessary to regulate the conduct of those who had simply sought refuge from adversity; and one of the greatest safeguards against the necessity for those rigorous measures, is a constant superintendence.

Plate LXXXIII.

This is the principal or ground plan. A is the front entrance. B the Commissioners' or board-room. C, the retiring-room. D, the clerk's room. E, waiting-rooms. F F, urinals or water-closets. G, passage to matron and master's apartments. H H, a vestibule or passage around the central building, and communicating with all the wards. I, day ward for males. K K, the porters' or overseers' rooms. 1 1, tables. 2 2, seats. L, ward for females, with rooms, M M, for those who have the superintendence. N, is a room for casual inmates. O, boys' ward. P, a ward for old married persons. Q, girls' ward. R, the chapel. S S, workshops for women. T, workshop for girls. U U, store rooms, intended for the use of the overseers. V, boys' workshops. W W, men's workshops. X X, store rooms. Y, the master's apartments. Z, the matron's apartments. *a a a a*, stairs leading to the basement and first floors. The basement under the central building and principal wings, is intended to be appropriated for kitchens and offices, wash-house and laundry, offices for coal, wood, dust, and the various store rooms required for the housekeeper, and for culinary purposes.

Plate LXXXIV.

This is the chamber, or first-floor plan. The central building A A, is appropriated to the use of the master and mistress. B, is the passage leading to the several wards. C, the men's bed-room. *a a*, beds. D, closets with necessary sinks and other conveniences. E, women's wards. *e e*, beds. F, closets with sinks, &c. G G, bed-rooms for married persons; or should this be refused by the arrangements of the guardians, the rooms might be appropriated as a sick ward for persons suffering from contagious disorders. I, sick ward. K, nurses' rooms. *a*, bed. *b*, bath. L, surgeon's room. M, surgery. N N, stairs. The roofs over the outhouses are shown on this plan.

Plate LXXXV.—Details.

Fig. 1. Is a section of a portion of the roof over the wing buildings.
Fig. 2. Is an elevation of the same, taken inside.
Fig. 3. Is an elevation of the gutter stanchions.
Fig. 4. Is a section of the floor over the wing buildings.
Fig. 5. Is an elevation of the same.
Fig. 6. Is a section of a portion of the ground floor.
Fig. 7. Is a longitudinal section of the same.
Fig. 8. Is a section of the foundation and footings.
Fig. 9. An elevation of the same.
Fig. 10. Shows the mode of constructing the floor of the central building.
Fig. 11. Is the same, with the joists.
Fig. 12. Shows the mode of fixing the ceiling joists.
Fig. 13. Exhibits the construction of the roof.
Fig. 14. Is a half section of the floor and roof.
Fig. 15. Is a half elevation of the central building, showing the finishings to a larger scale.

DESIGN FOR A GRANARY.

Among the early eastern nations it was probably the custom to establish large public storehouses for corn, from which the inhabitants were able to obtain a supply of food during times of scarcity. Individuals were then, more than even in the present day, improvident; and it became necessary, in countries where unproductive seasons were not uncommon, that the government should make some provision against the terrible effects of famine. The limited intercourse between nations, the ignorance of the principles of foreign trade, the want of large vessels fitted for merchandise, and many other causes, united to prevent the possibility of much foreign assistance under such trying catastrophes; in addition to which causes, the jealousy existing between rival states, and the wars so frequently resulting therefrom, would too frequently have prompted an invasion, rather than a supply from the people to whose sympathy the application was made. Governments were, under these circumstances, compelled to provide stores of food for the consumption of its dependent population, to meet the possibility of the public want.

In the book Genesis two instances are mentioned of famine, and one of these gives us an interesting view of the provisions made in Egypt to meet the wants of the people in a time of scarcity. The first instance is that when Abram visited the country. "And Abram journeyed, going on still toward the south. And there was a famine in the land: and Abram went down into Egypt to sojourn there; for the famine was grievous in the land." The subsequent history details the manner in which he was treated by Pharaoh and his princes, and his subsequent dismissal, from having falsely represented Sarai his wife as his sister. This incidental notice of the Egyptians in the history of Abram, gives us a favourable view of their hospitality, and their regard for the marriage contract; and it also proves that at an early period Egypt was a great country, productive in itself, and possessing public regulations by which the evils of famine were mitigated or avoided.

But there is a much more detailed account of the provisions made for a time of famine, in the inimitably pathetic history of Joseph. "And when all the land of Egypt was famished, the people cried to Pharaoh

for bread: and Pharaoh said to all the Egyptians, Go unto Joseph; what he saith to you, do. And the famine was over all the face of the earth. And Joseph opened all the storehouses, and sold unto the Egyptians: and the famine waxed sore in the land of Egypt. And all countries came into Egypt to Joseph to buy corn; because that the famine was so sore in all lands." At first the Egyptians came to the storehouses and bought corn, but "when money failed in the land of Egypt, and in the land of Canaan, all the Egyptians came to Joseph, and said, Give us bread: why should we die in thy presence? for the money faileth. And Joseph said, Give your cattle; and I will give you for your cattle, if money fail. And they brought their cattle unto Joseph; and Joseph gave them bread in exchange for horses, and for the flocks, and for the cattle of the herds, and for the asses: and he fed them with bread for all their cattle that year. When that year was ended, they came unto him the second year, and said unto him: We will not hide it from our lord, how that our money is spent: my lord also hath our herds of cattle, there is not ought left in the sight of my lord but our bodies and our lands: wherefore shall we die before thine eyes, both we and our land? Buy us and our land for bread, and we and our land will be servants unto Pharaoh; and give us seed, that we may live, and not die, that the land be not desolate." And Joseph bought all the land of Egypt for Pharaoh; for the Egyptians sold every man his field, because the famine prevailed over them: so the land became Pharaoh's." In all these arrangements we perceive evidences of wisdom, such as few statesmen have exhibited under signally trying circumstances. The cattle being bought by Pharaoh were fed and preserved; the people were supported, though at the loss of all they possessed; but the master-stroke of policy was in the return of the land to its original proprietors, under the condition that one-fifth of the produce should come to the public granary to meet any future similar exigency. "Then Joseph said unto the people, Behold, I have bought you this day and your land for Pharaoh: lo, here is seed for you, and ye shall sow the land. And it shall come to pass in the increase, that ye shall give the fifth part unto Pharaoh, and four parts shall be your own for seed of the field, and for your food, and for them of your households, and for food for your little ones. And Joseph made it a law over the land of Egypt unto this day, that Pharaoh should have the fifth part, except the land of the priests only, which became not Pharaoh's."

The commerce of this country, and the altered condition of nations, render it unnecessary that large government storehouses for corn should be erected; but the changes already made in the laws regulating the importation of corn will probably lead to the formation of such buildings by private merchants and speculators, so that a design for a granary seemed an appropriate subject to appear among the public buildings of this country. Under this impression it has been introduced; and the architect will, it is hoped, obtain from our design some hints which will guide him in the arrangement and construction of such a building.

Plate LXXXVI.

The upper portion of this plate consists of a design for a public or private Granary. It is proposed to be of an octangular form, so as to admit of division into several bays or compartments, which may be appropriated to different descriptions of corn, access being provided to each, both externally and internally, with a suitable threshing-floor in the centre. By adopting this arrangement, eight separate compartments are obtained, each of which will receive a large quantity of corn. External doors are provided to each division, so that corn may be brought in or carried out without entering any other portion of the building. It has also been thought necessary that there should be a passage through the granary; and the central space being an octagon of thirty feet in diameter, it will contain three carts or waggons which may load or unload at the same time, and this would be of great convenience in wet weather, or at other periods when it may be desirable that the removal should be under shelter, and not in the open air. A threshing-floor is provided over this space, and is lighted and ventilated from above; the openings shown in the section being filled with perforated zinc, will admit a sufficient light and ventilation, and be a perfect protection from the entrance of birds and insects.

The doors upon each side of the principal front, as shown in the elevation, form different stages, and are indispensable. They may be opened and closed by means of cords working from the interior, and the upper or lower may be used as shall be most convenient.

Fig. 1. Is a quarter-plan, showing one bay finished and ready for the reception of corn.

Fig. 2. Is a quarter-plan of the foundations, showing the construction.

Fig. 3. Is a portion of the threshing-floor, which should be formed of white deal six inches in thickness, and dowelled. To prevent the entrance of vermin, and to form a solid foundation, it should be laid on a bed of concrete at least three feet thick.

Fig. 4. This is a section of a portion of the floor, showing the dowel and pinning.

Plate LXXXVII.

Fig. 1. Is a plan of the timbers for the room over the ground floor.

Fig. 2. Is the same with the common rafters introduced.

Fig. 3. Is a plan of the roof in its finished state.

Fig. 4. Is a section of the roof, showing the truss complete.

Fig. 5. Is an elevation of one of the gable ends.

Fig. 6. Is a section taken through the centre of the building. It may be here observed that the spaces on each side of the gates communicate with their respective bays or compartments, the floors of which are constructed with brick arches springing from iron bearers raised about three feet above the top of the concrete.

Fig. 7. Shows the construction of the arches and iron springers to a larger scale.

Fig. 8. Is a plan of the centre of the doors.

DESIGN FOR A PUBLIC ARCHWAY.

The introduction of railways into this country, has greatly aided the progress of the art of building, in all its varied departments. In the formation of an entirely new system of roads throughout the country, and in making these, as nearly as possible, horizontal, many difficulties must have presented themselves, which could only be overcome by new inventions and untried modes of practical work. When a man has a choice of means he will generally accommodate his work to his knowledge, and rather than voluntarily undergo great mental fatigue in the invention of a new mode, and take some risk in the execution of his plans, he will make such deviations from the original intention, as will enable him to adopt the systems already proved by experience; thereby saving himself the fatigue of thought, and the risk of failure. In railway work this could not be done. The line of road being once selected, there was scarcely a possibility of changing its course; and as unexpected difficulties arose, it became imperative on the engineer to meet, rather than to avoid them—to surmount the impediment, rather than to go round it. This necessity for strong mental activity has put to the test the powers of the engineer, and has often been to him a source of great perplexity; but the advantages to the art of building have been great in proportion. Time has already tested the value of many of these inventions, and fixed upon them the stamp of her approbation—while others in which defects were observed, have been so modified as to correct the faults of the first design.

It would be easy to point out numerous instances of the improvements in the art of building generally, resulting from railway practice; but in none has this been more productive of advantage than in arch-building. There have been on various lines of railway numerous failures; but these have tended to establish truth and to detect the sources of error. Modes of practice have been adopted, and facilities of execution have been obtained, which had not been before discovered, and were scarcely anticipated—difficulties once considered insurmountable have been met without fear, and forms before unknown have become common.

If we turn to the past history of building and architecture, and compare the knowledge of any one period with that possessed by experienced persons in the present day, we cannot fail to be struck with the superiority

of their architecture, and the deficiencies of their knowledge of building. The Greeks, with whom no modern nation, although possessing all the advantages to be derived from the works of preceding generations, can be compared in taste, possessed a competent knowledge of the mode of constructing walls and of bonding the work together; for their buildings have stood the test of time, and have descended to our own day with scarcely any other injury than that produced by the hand of the barbarian and the fanatic. Yet the Greeks were unacquainted with the principles of the arch—it is a form not to be seen in any of their works. The very style they adopted would not even admit of its introduction in a conspicuous part of their buildings; and so singular has this deficiency appeared to many writers, that the inapplicability of the arch to their style has been used to account for the absence of that principle in all their structures, and to remove the supposition of their ignorance. But, on the other hand, it must be admitted that there are numerous opportunities of introducing the arch with advantage where it would greatly facilitate the builder without interfering with the style; and these opportunities would not have been lost if the Greeks had possessed a knowledge of the properties of the arch. We must therefore conclude that they were ignorant of its construction.

The Romans must be considered as the inventors of the arch; and they introduced it with great effect in their triumphal gates, and in many other of their public structures. These must have appeared at the time of their erection surprising results of science, as well as superb specimens of art; but compared with many of the structures of the present day, they lose all their importance as practical works, although they retain their superiority as elegant designs. Could we imagine, that at some far distant period, England would meet with the fate of the Roman empire, we might speculate upon the feelings that would be produced in the mind of some curious stranger by the ruins of our railways. Traversing the country from one place to another, he would here and there meet with a solitary arch, or portions of the viaducts, rarely distinguished for architectural taste, but as works of construction almost perfect. These he would find distinguished by all imaginable varieties of character, and in every form into which they could possibly be thrown—some spreading out over enormous spans—others towering to great heights—some formed at right angles to what he imagines to have been the roadway, and others of that peculiar construction called

skew-arches. But why should we imagine such a catastrophe, for the purpose of producing such an event, as the inspection of a civilized stranger after an interval of ages of desolation? Let the student now take a careful examination of our works in their perfect state, and he will find abundant reason to be satisfied with the progress that has been made in scientific building.

It is not the intention of the author, in the accompanying drawings, to describe all the forms of the arch which may be adopted, but rather to point out one or two of the most simple, such as are frequently required in practice. For this purpose he has presented the reader with a design for a public archway, and has added to it a few details, which will, it is anticipated, be found very useful to those for whom the Designs for Public Buildings are chiefly intended.

Plate LXXXVIII.

Fig. 1. This is a design for an Archway proposed to be erected upon the intersection of two cross-roads, and is suitable for a turnpike or railroad, or for a gentleman's grounds. It would be easy to adapt it to a railway crossing over roads, by the removal of the dome.

Fig. 2. Is the plan.

Plate LXXXIX.

Fig. 1. This is the plan supposed to be accurately taken when the building has been carried as high as the springing. A is a semicircle, and the radius may be divided into a number of equal parts, from which perpendicular lines, *a b*, are erected, touching the curve. Continue these perpendicular lines to the diagonal line, B, and from the point *d* erect lines perpendicular to the line B, and of the same length as the lines *a b*, with which they are severally connected:—thus the line *c d* is to be of the same length as *a b*, $c' d'$ as $a' b'$. By connecting all the points $c\, c'\, c''$, a curve will be produced, which is called the curve of the angle-rib.

Fig. 2. Is an elevation of the semi-ribs, or centering for the semi-circular arch, which is shown in plan at *b b* in *Fig.* 4.

Fig. 3. Is an elevation of the angle-ribs.

Fig. 4. Is a half-plan, showing the ribs. *c c c* are termed jack-ribs, and are segments of circles.

Fig. 5. Is a half-plan, showing the boarding.

Fig. 6. Is the principal cornice to a large scale.

Fig. 7. Is the string-course to the dome.

Fig. 8. Is the cap of the antæ.

Fig. 9. Is the base of the antæ.

Fig. 10. Is the impost moulding.

Fig. 11. Is a section of the rustic.

Plate XC.

Fig. 1. Is a semi-circular arch of brickwork.

Fig. 2. Is a semi-circular arch of stone. In this and in the previous arch, all the joints are in lines, which, if produced, will meet in the centre *a*, as shown by the dotted lines.

Fig. 3. Is an elliptical arch in brickwork.

Fig. 4. Is an elliptical arch in stone. In arches of this form the lines of the joints, if produced, would fall on the centres of the respective curves.

Fig. 5. Is an arch, the segment of a circle, in brickwork.

Fig. 6. Is an arch of the same form in stone.

THE END.

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PERSPECTIVE VIEW.

FIG. I.

HALF PLAN OF GROUND FLOOR

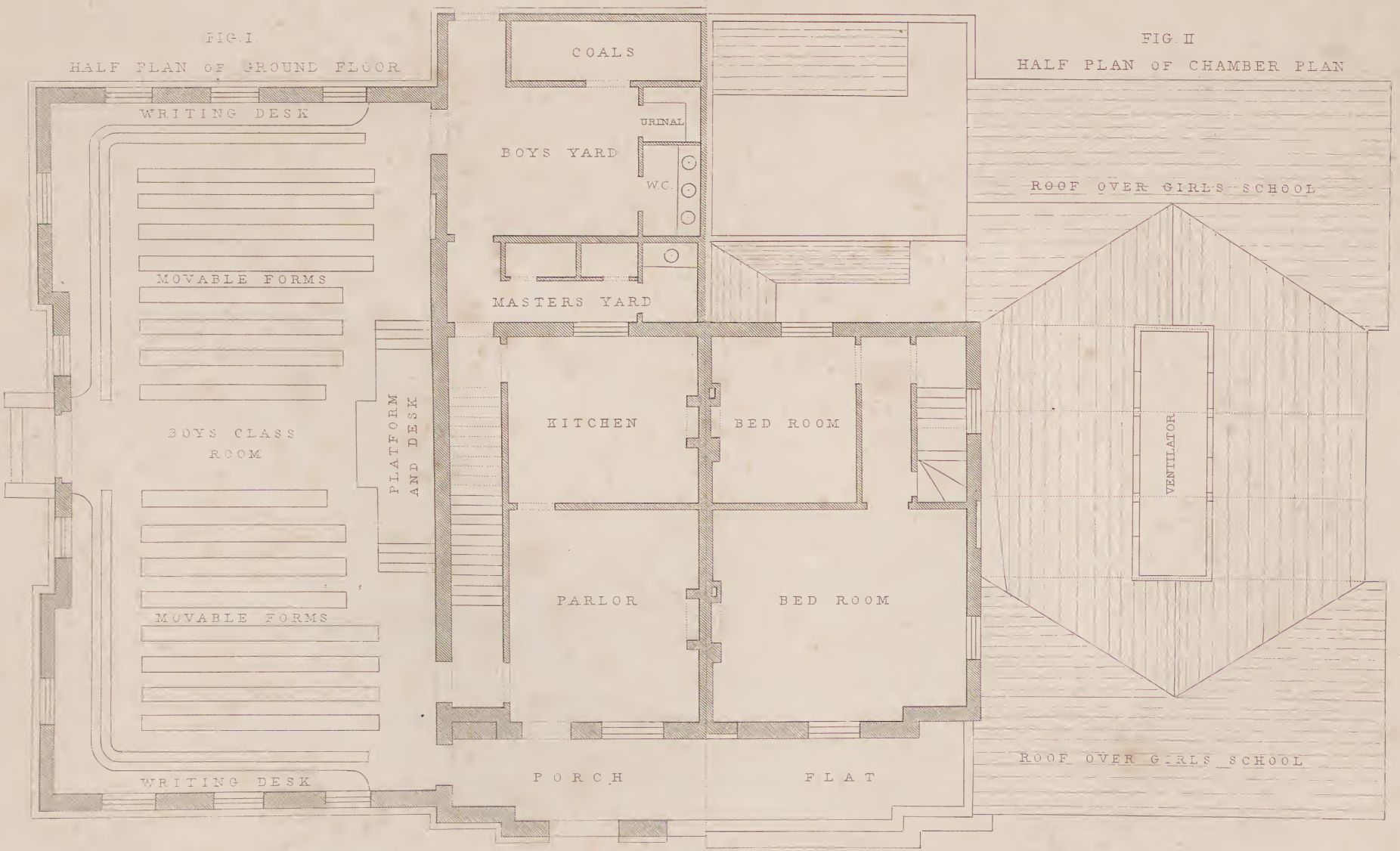


FIG. II

HALF PLAN OF CHAMBER PLAN

SCALE OF FEET

LONDON THOMAS KELLY, 1843

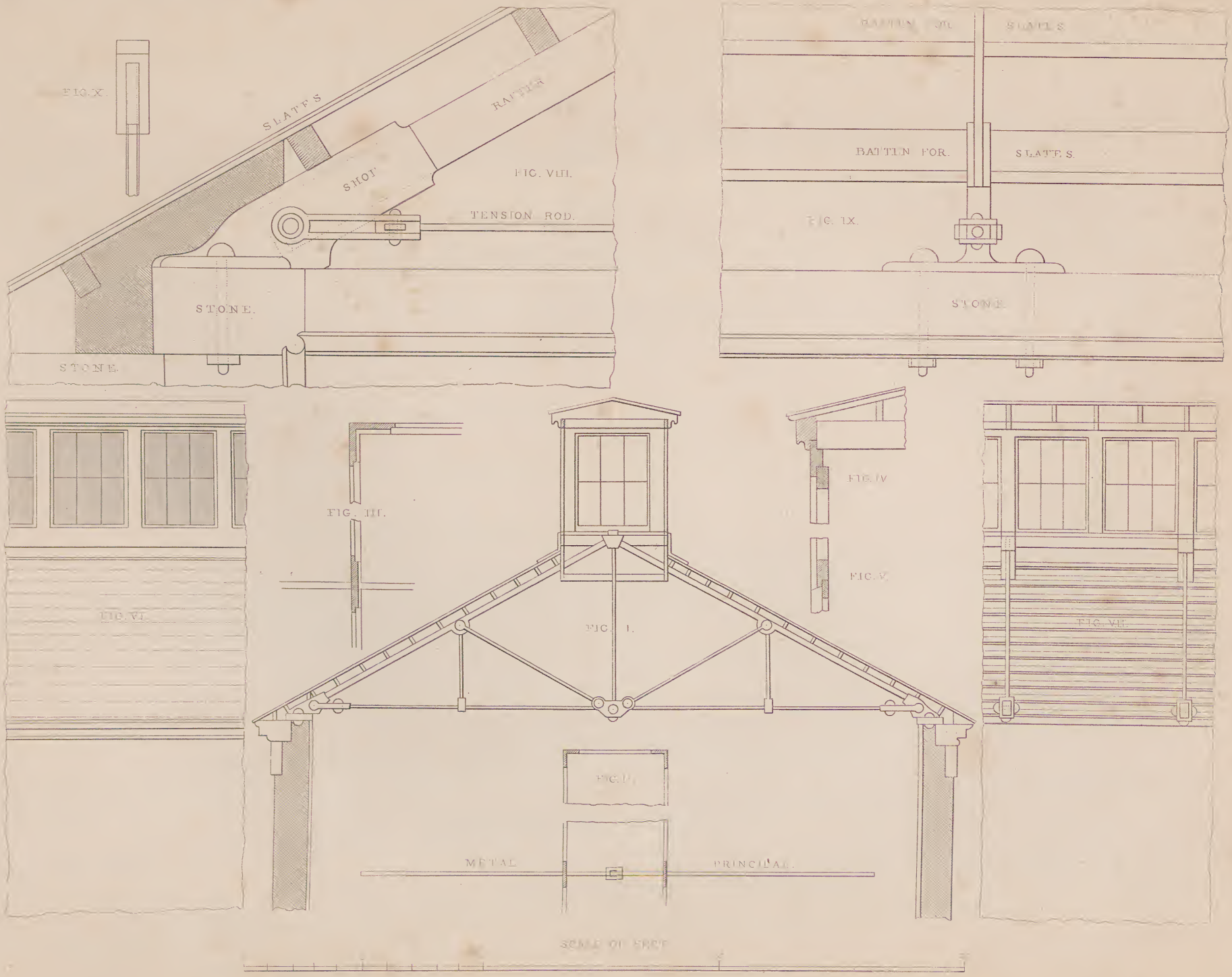


FIG. X.
SLATES
RAFTER
SHOT
FIG. VIII.
TENSION ROD.
STONE.
STONE.
BATTEN FOR
SLATES
BATTEN FOR.
SLATES.
FIG. IX.
STONE.
FIG. III.
FIG. IV
FIG. V.
FIG. VI.
FIG. I.
FIG. VII.
FIG. II.
METAL
PRINCIPAL.
SCALE OF FEET

FIG. 1

PERSPECTIVE VIEW

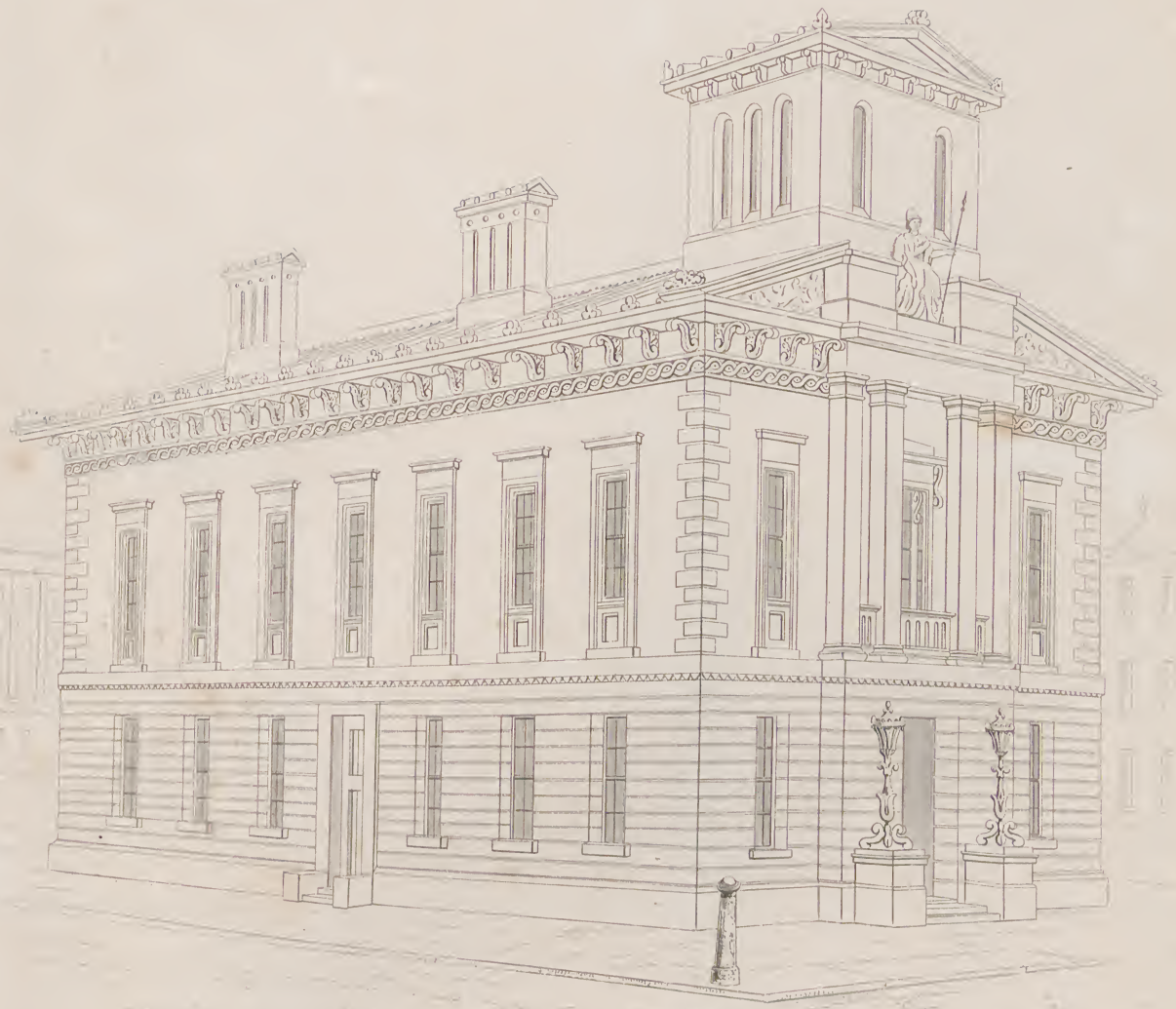
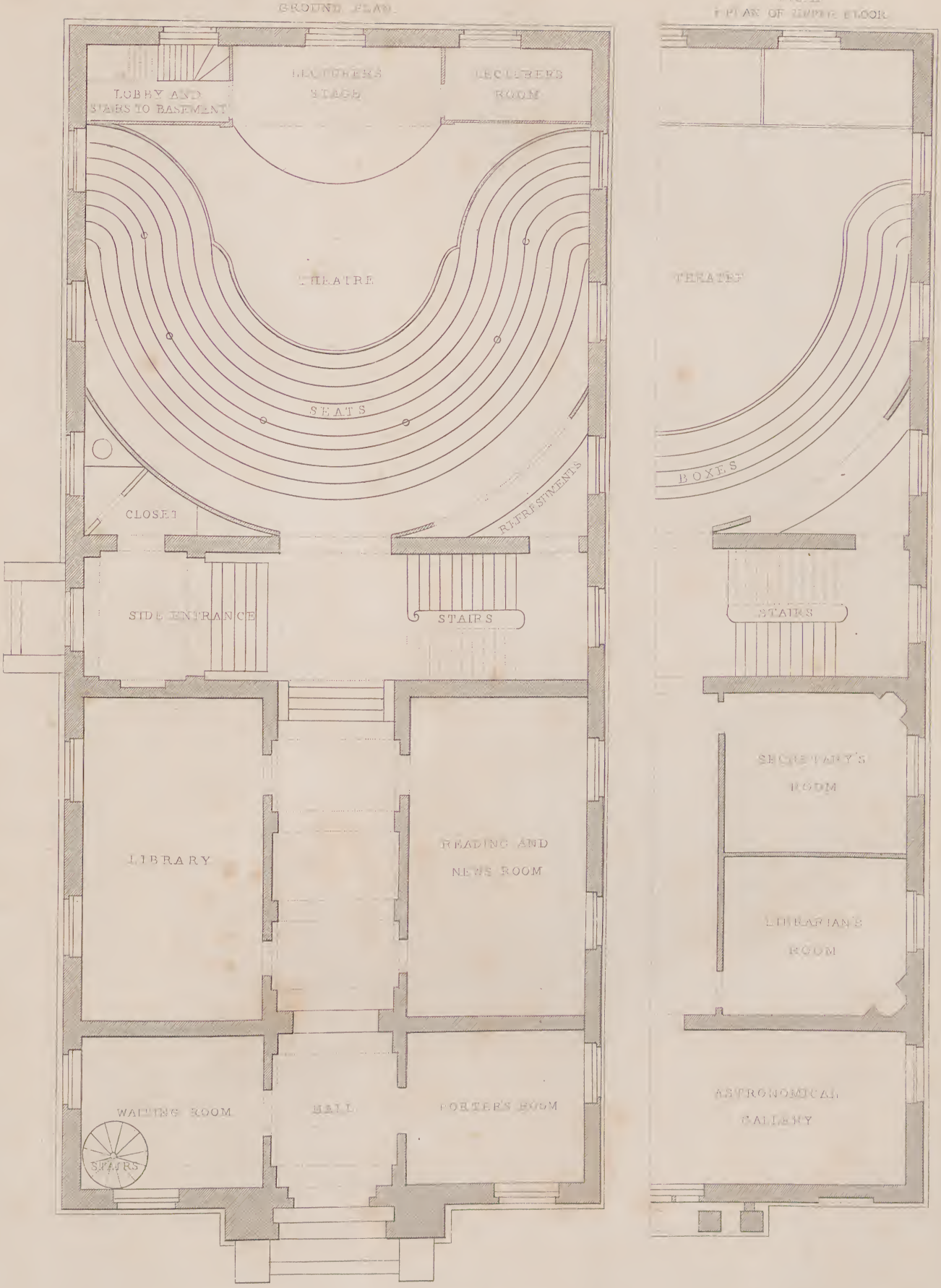


FIG. I.
GROUND PLAN.

FIG. II.
PLAN OF UPPER FLOOR.

PLATE 4



SCALE OF FEET

0 1 2 3 4 5

FIG. XVI.

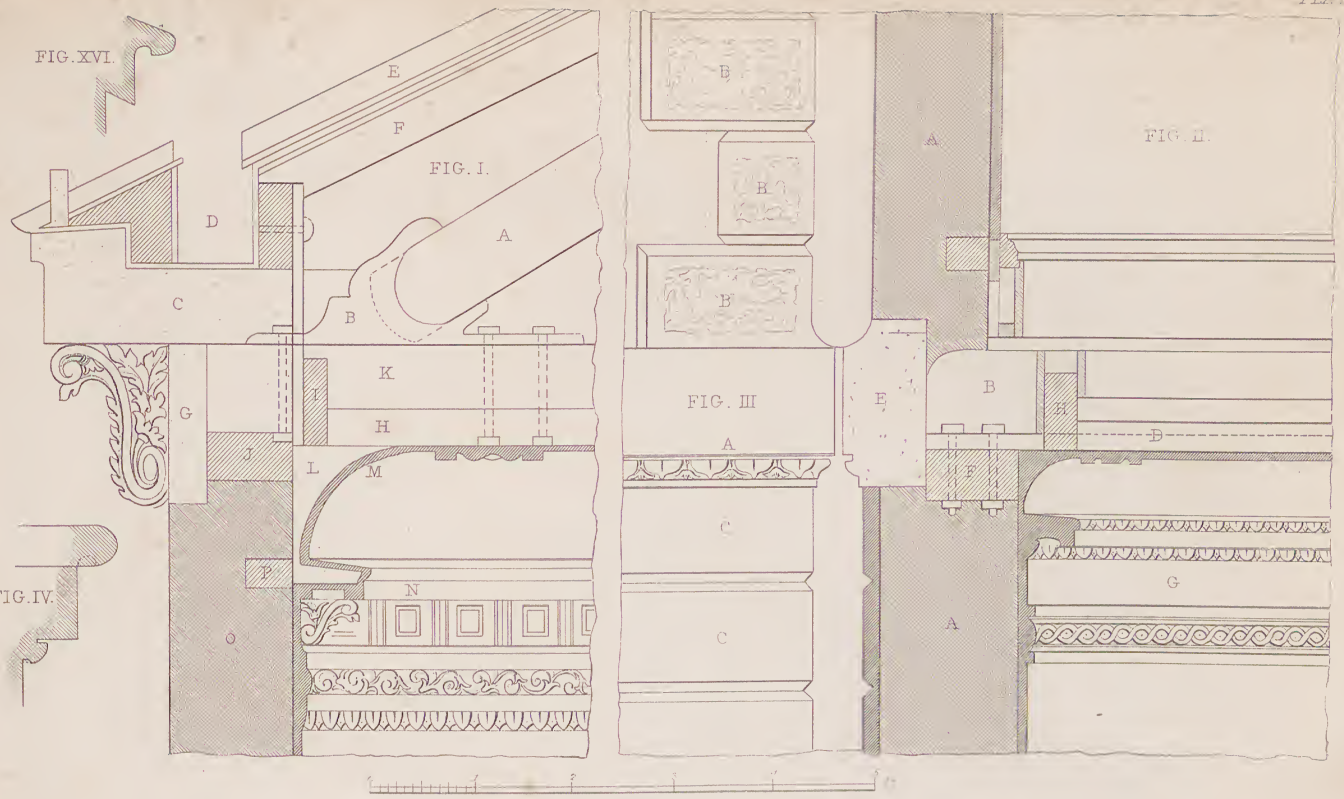


FIG. V.

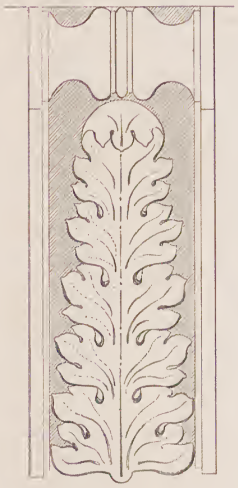


FIG. VI

FIG. VII.

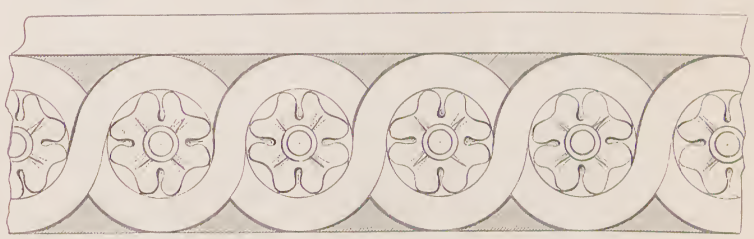


FIG. VIII.

FIG. IX.

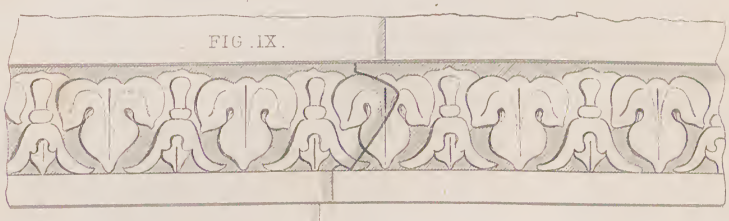


FIG. X.

FIG. XI.

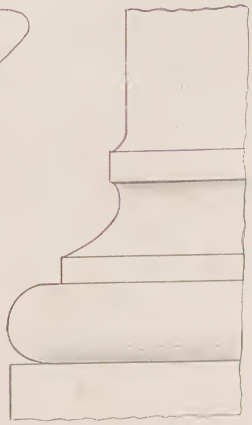


FIG. XII.

FIG. XIII.

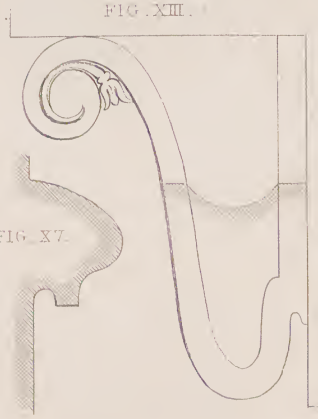


FIG. XV.

FIG. XIV.

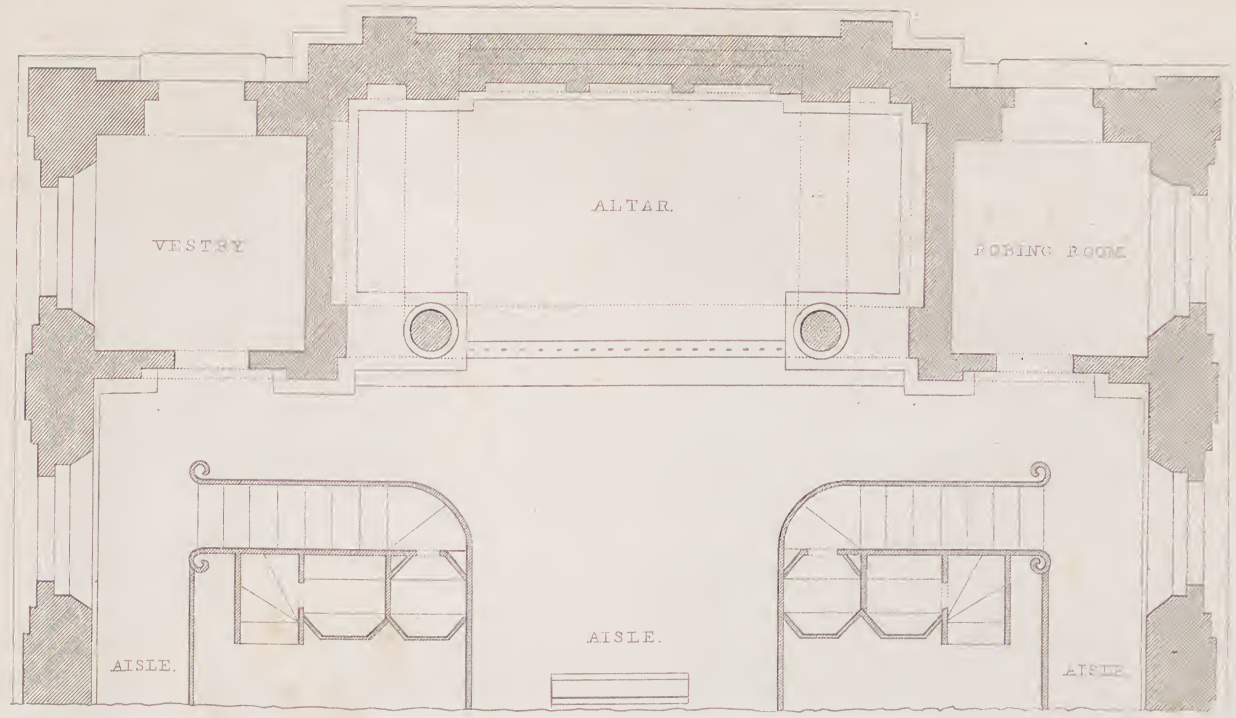
S. H. BROOKS, ARCT.

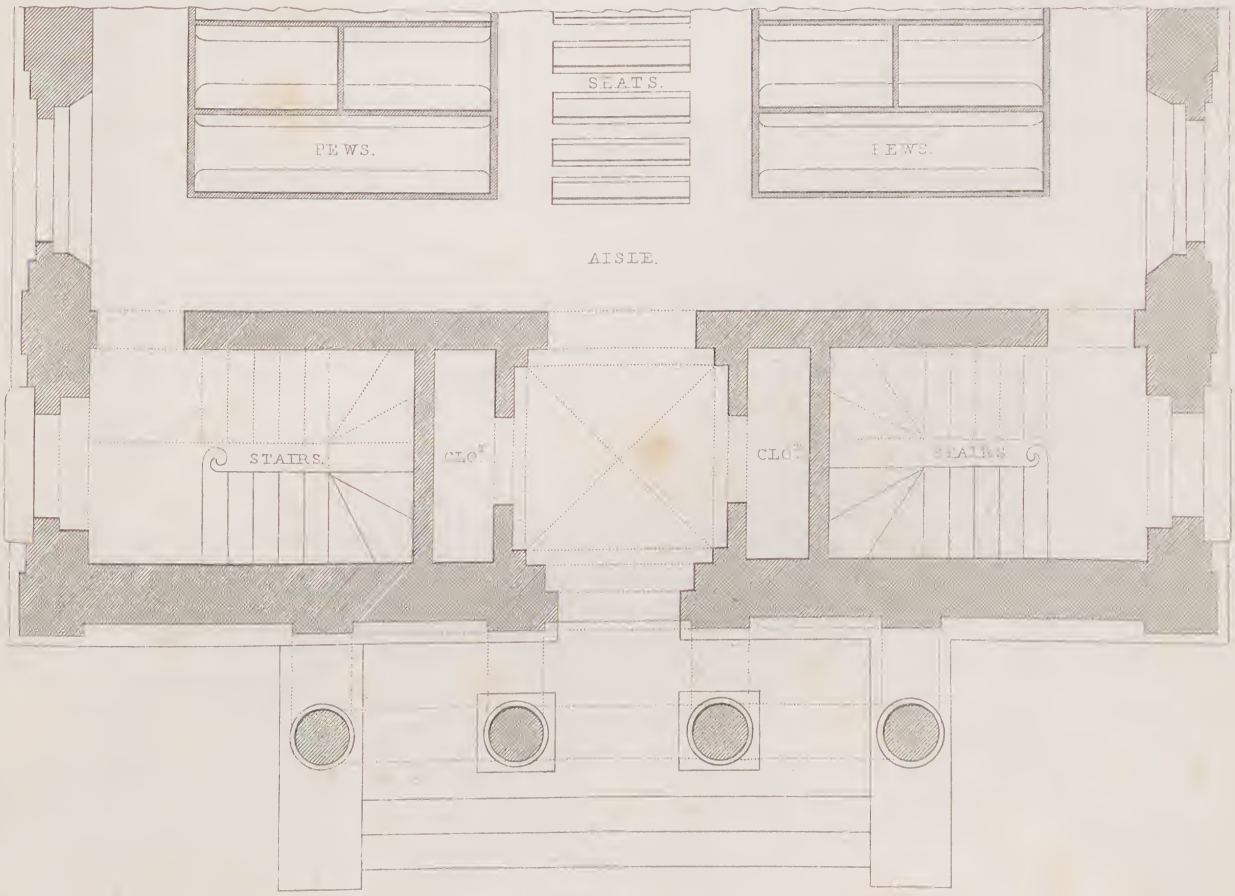
LONDON. THOMAS KELLY. 1841.

PERSPECTIVE VIEW OF CHAPEL

PLATE

PLAN OF ALTAR.





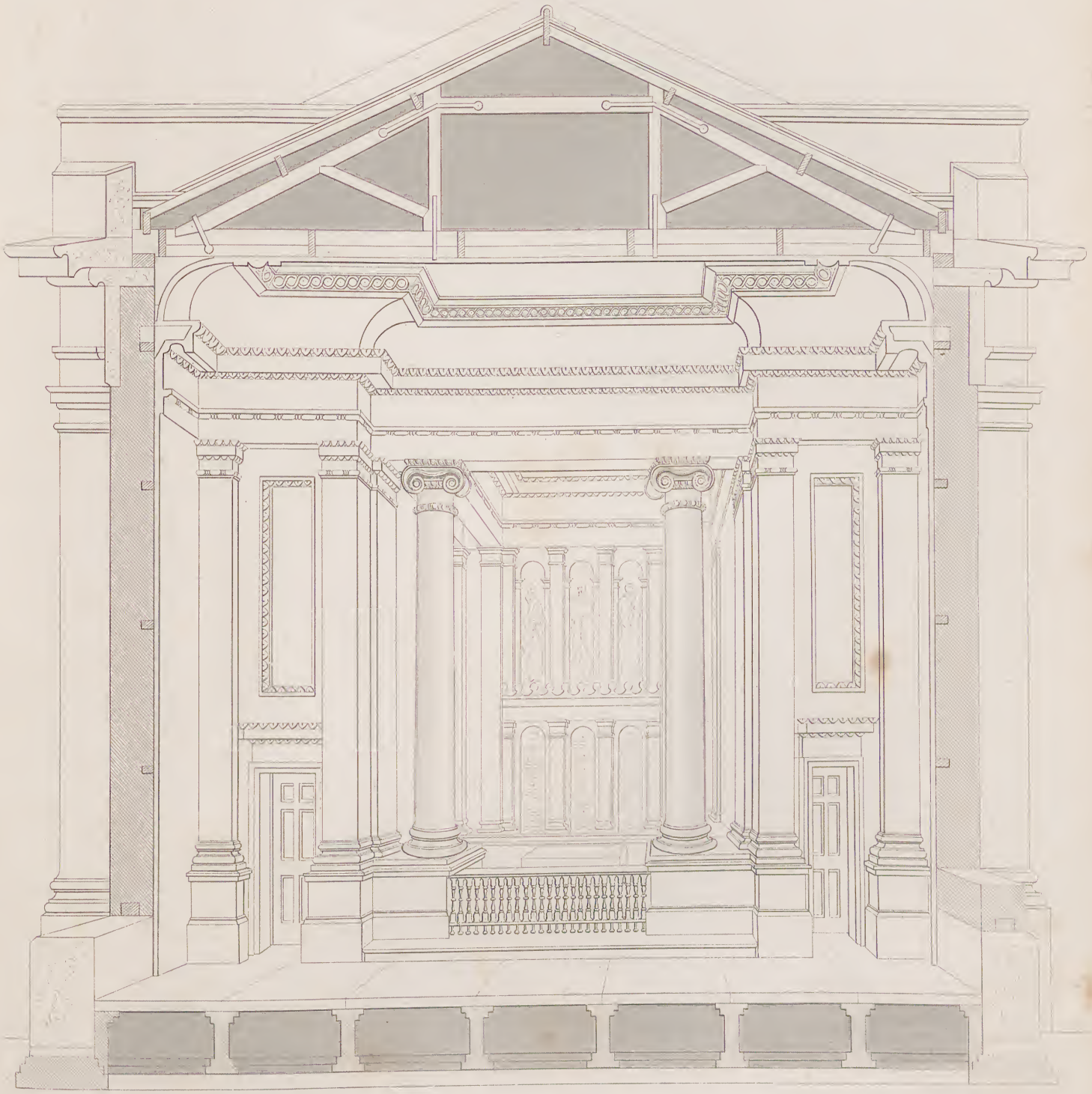
PLAN OF ENTRANCE.

SCALE OF FEET.

LONDON: THOMAS KELLY 1843

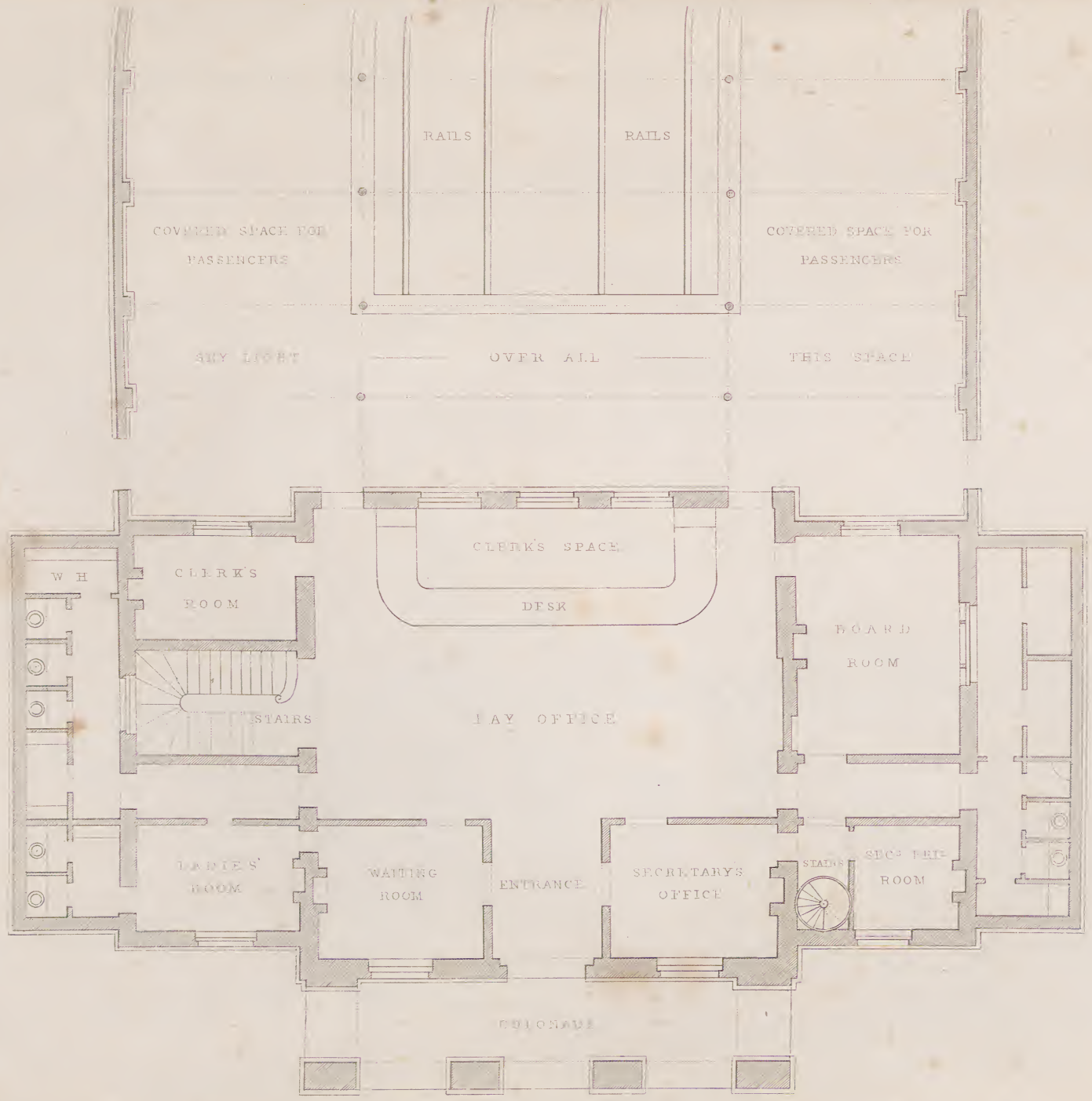
TRANSVERSE SECTION

SHOWING ALTAR IN PERSPECTIVE



PERSPECTIVE VIEW.

GROUND PLAN



SCALE OF FEET

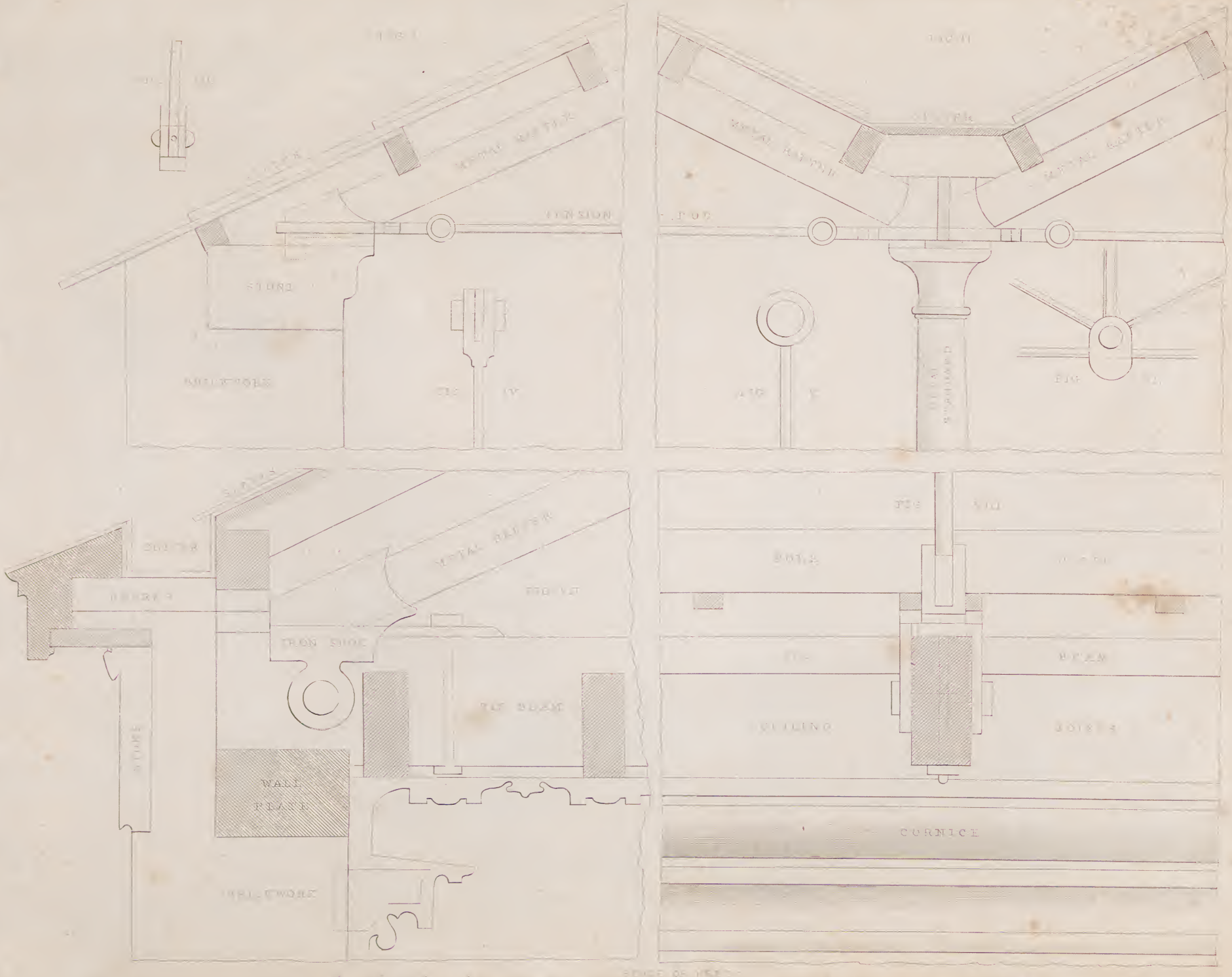
TRANSVERSE SECTION

LOOKING TOWARDS PRINCIPAL BUILDING.

SCALE OF FEET

0 10 20 30 40 50

LOUIS H. THOMAS, ARCH'T. 1852


METAL GUTTER
TENSION
STONE
BRICKWORK
IRON SHOE
TIE BEAM
WALL PLATE
BRICKWORK
METAL GUTTER
TIE
BEAM
CEILING
JOISTS
CORNICE

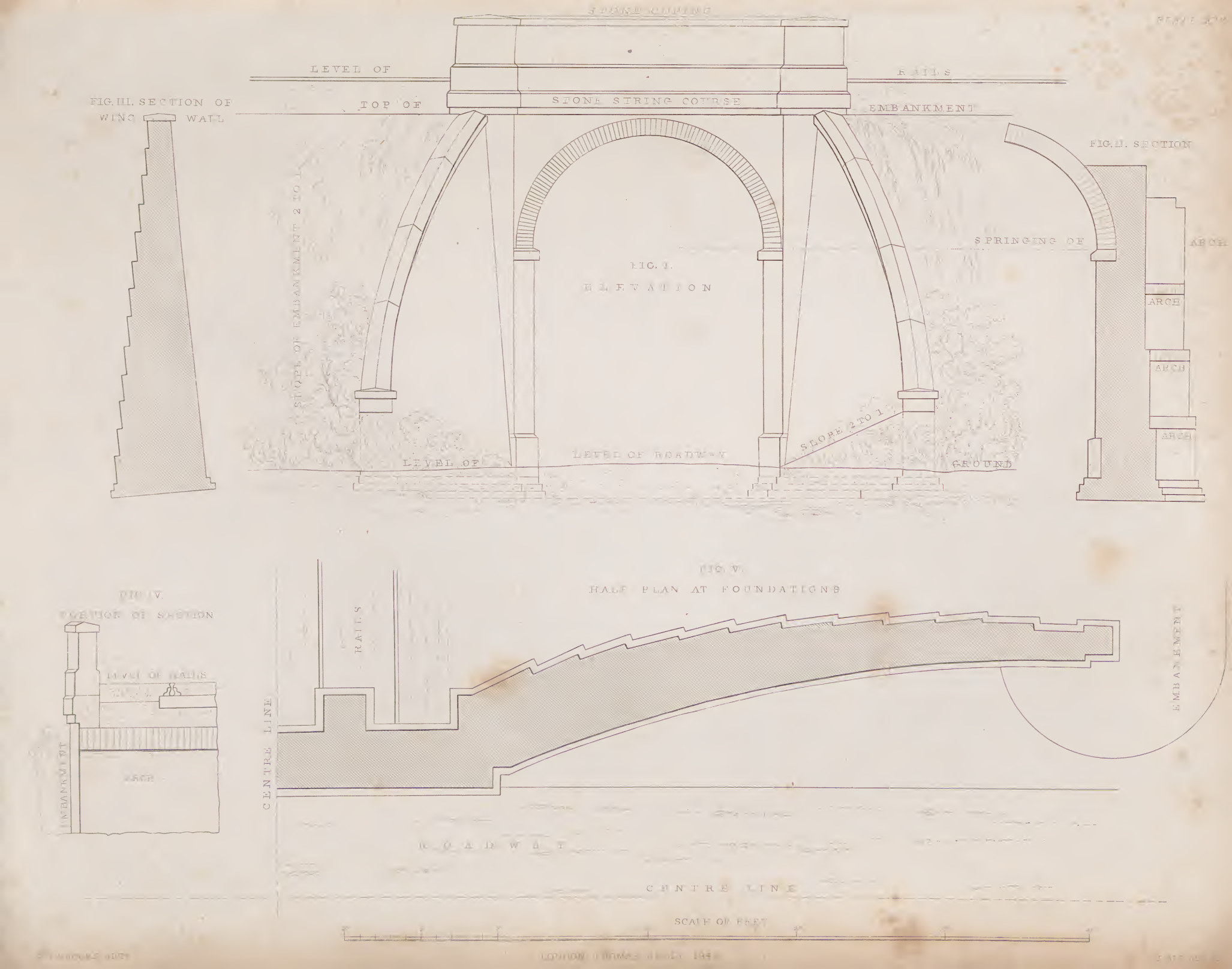


FIG. III. SECTION OF WING WALL
LEVEL OF
TOP OF
STONE STRING COURSE
RAILS
EMBANKMENT
SLOPE OF EMBANKMENT 2 TO 1
FIG. I.
ELEVATION
SPRINGING OF
ARCH
FIG. II. SECTION
ARCH
ARCH
ARCH
SLOPE 2 TO 1
LEVEL OF
LEVEL OF ROADWAY
GROUND
FIG. IV.
ELEVATION OF SECTION
LEVEL OF RAILS
EMBANKMENT
ARCH
FIG. V.
HALF PLAN AT FOUNDATIONS
RAILS
CENTRE LINE
EMBANKMENT
ROADWAY
CENTRE LINE
SCALE OF FEET

FIG. I. HALF ELEVATION

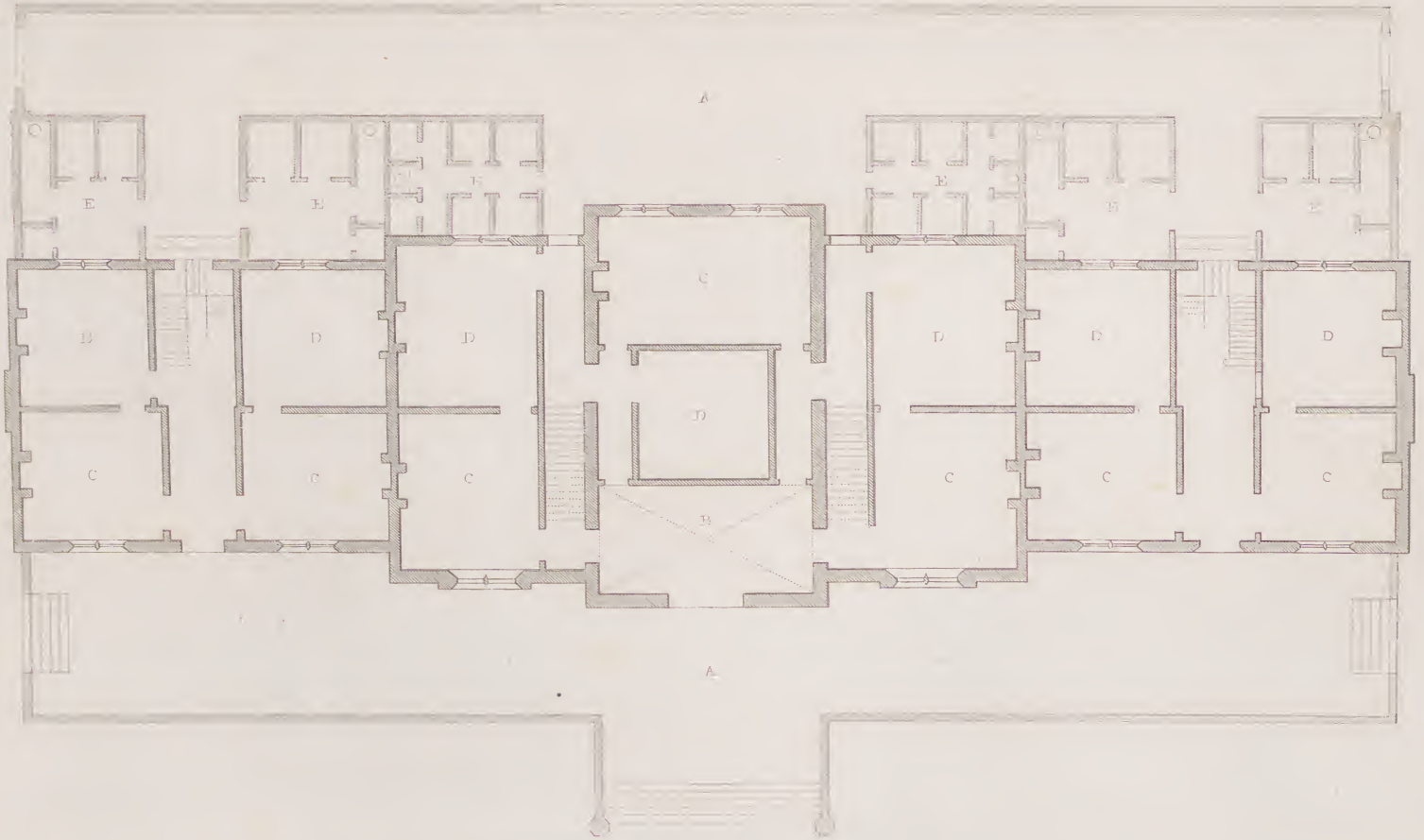
FIG. II. HALF SECTION.

LONDON THOMAS KELLY 1842

H. ADLARD SC.

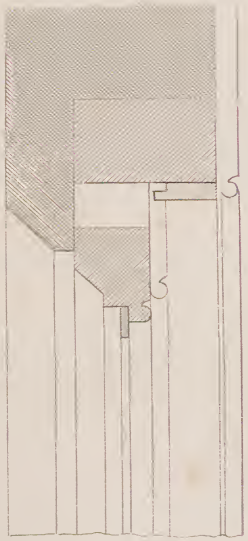
PERSPECTIVE VIEW.

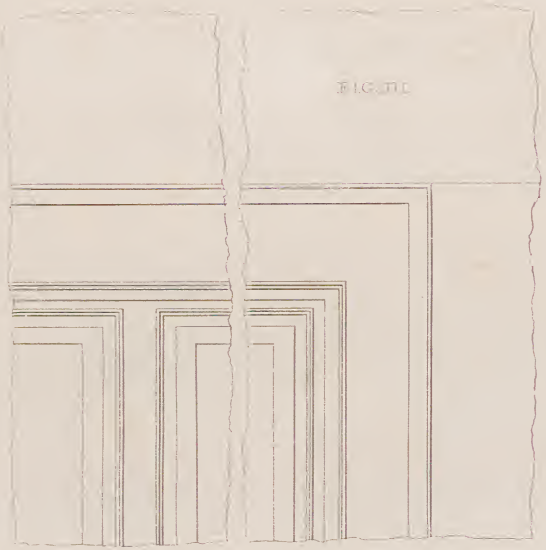
GROUND PLAN

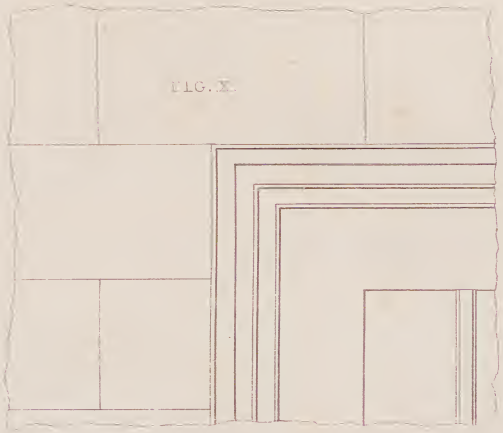


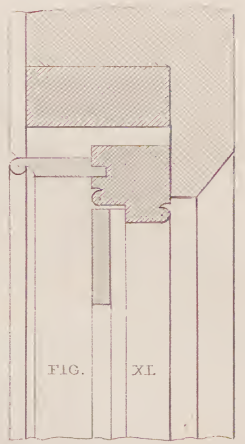
SCALE OF FEET

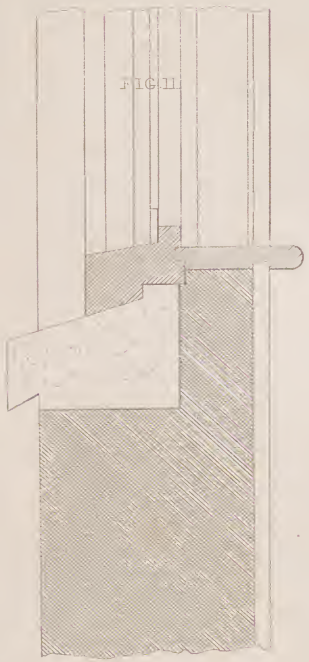
FIG. I.

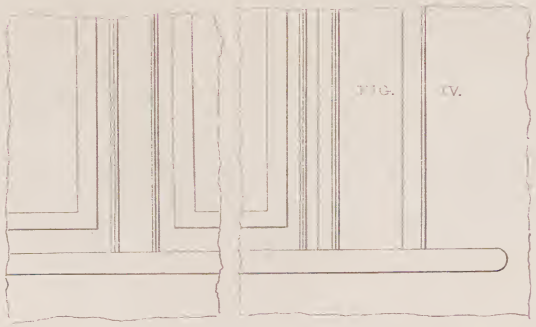


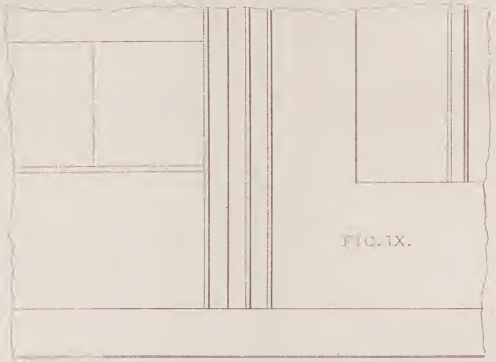


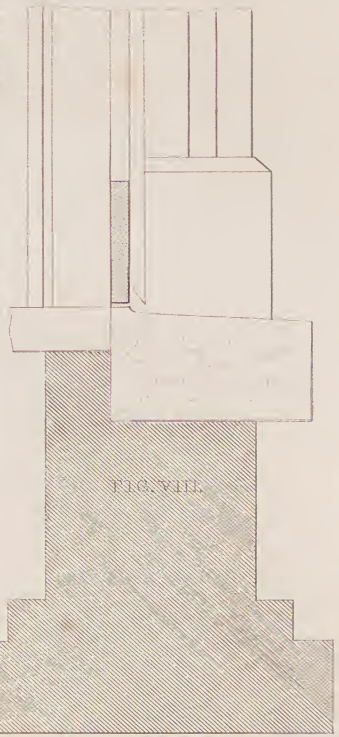


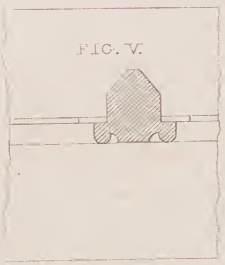


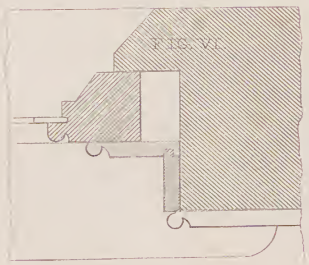


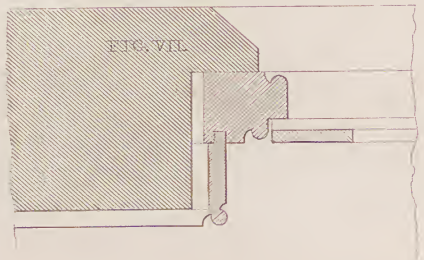








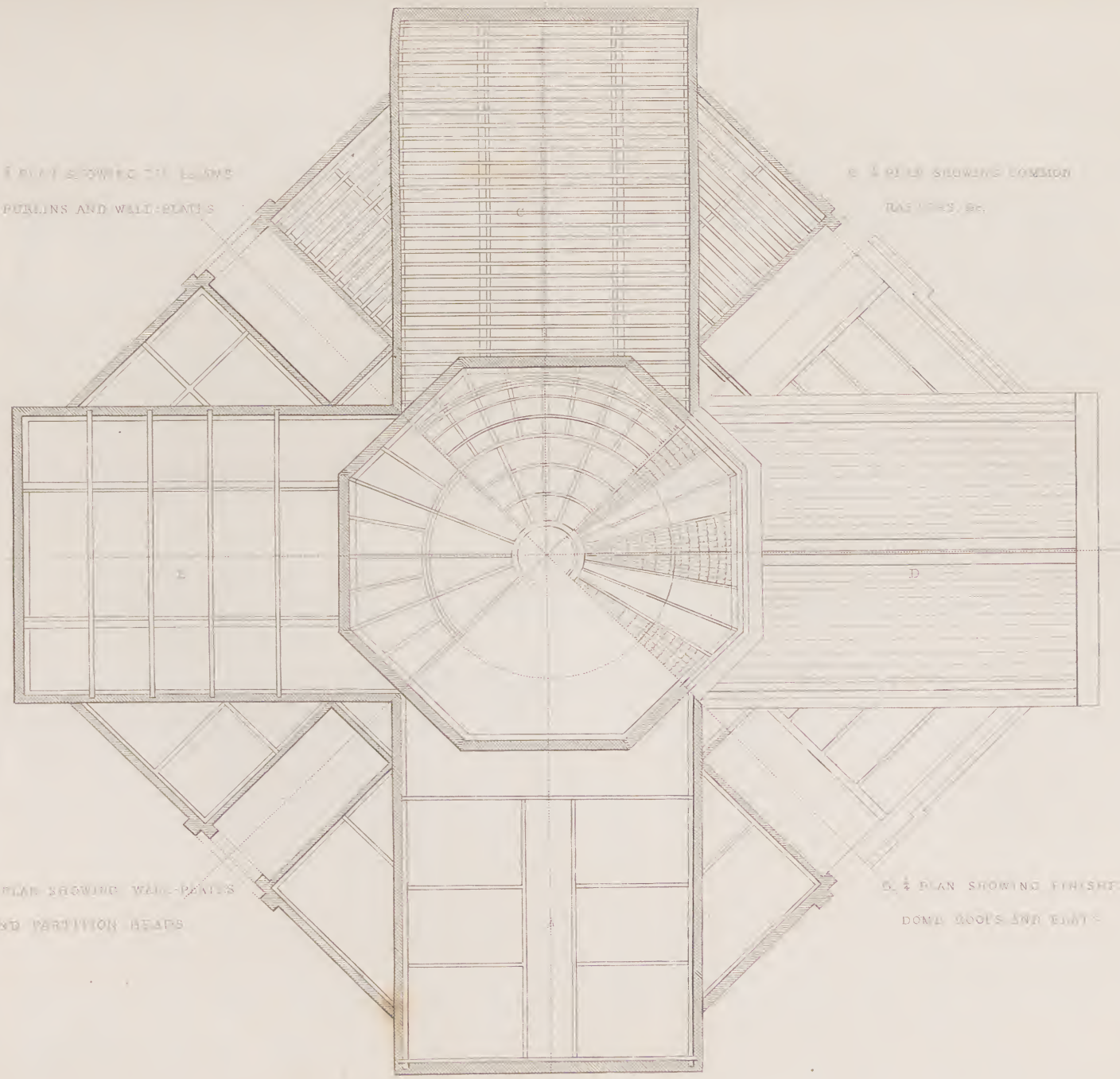




SCALE OF FEET

LONDON THOMAS KELLY 1843

PERSPECTIVE VIEW



B. ½ PLAN SHOWING CONNECTING LONG PURLINS AND WALL-PLATES

C. ½ PLAN SHOWING COMMON RAFTERS, &c.

A. ½ PLAN SHOWING WALL-PLATES AND PARTITION BEARS

D. ½ PLAN SHOWING FINISHED DOME, ROOFS AND LIGHT

SCALE OF FEET

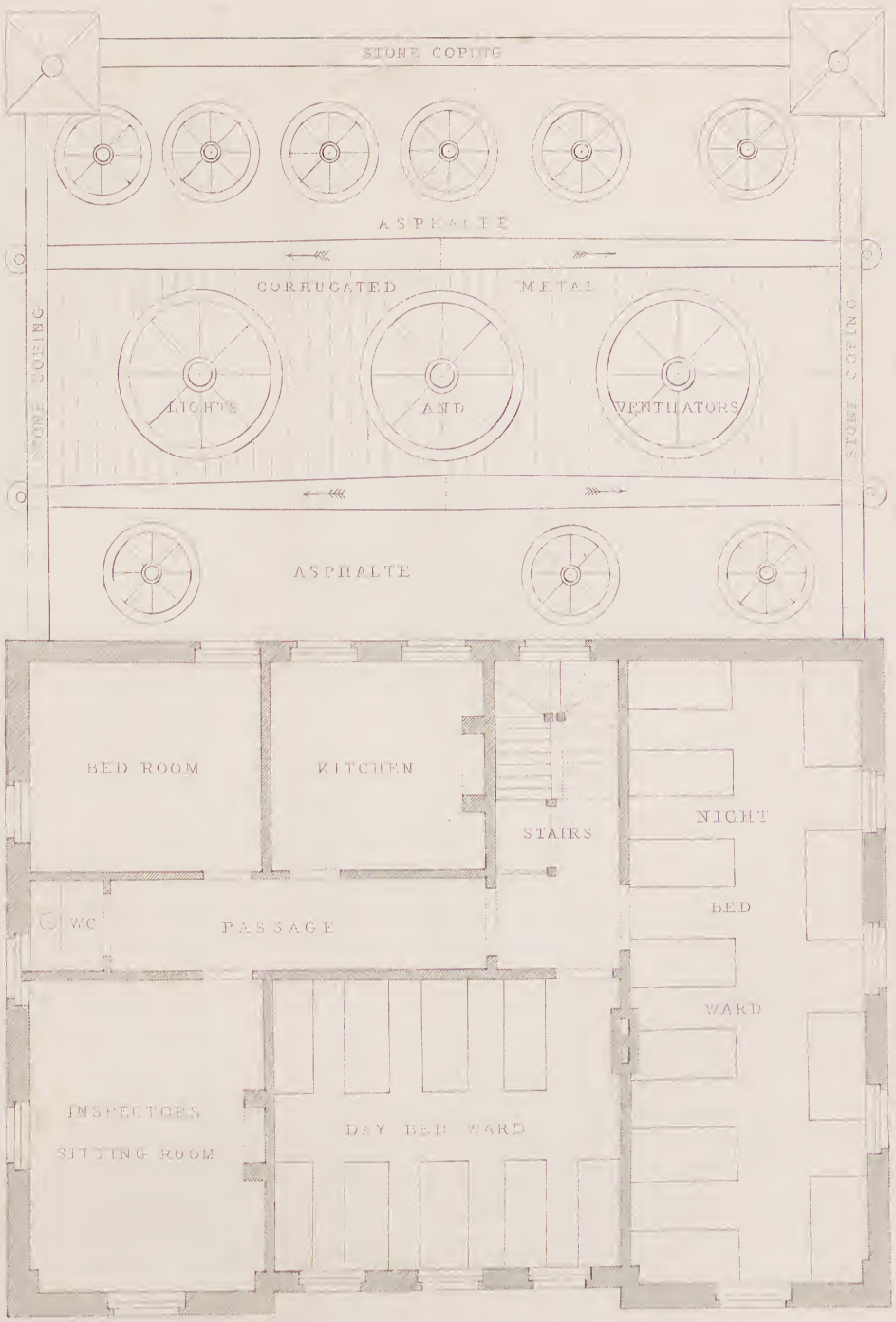
PLATE XXI

PERSPECTIVE VIEW

DRAWN THOMAS REID 1852

SCALE OF FEET

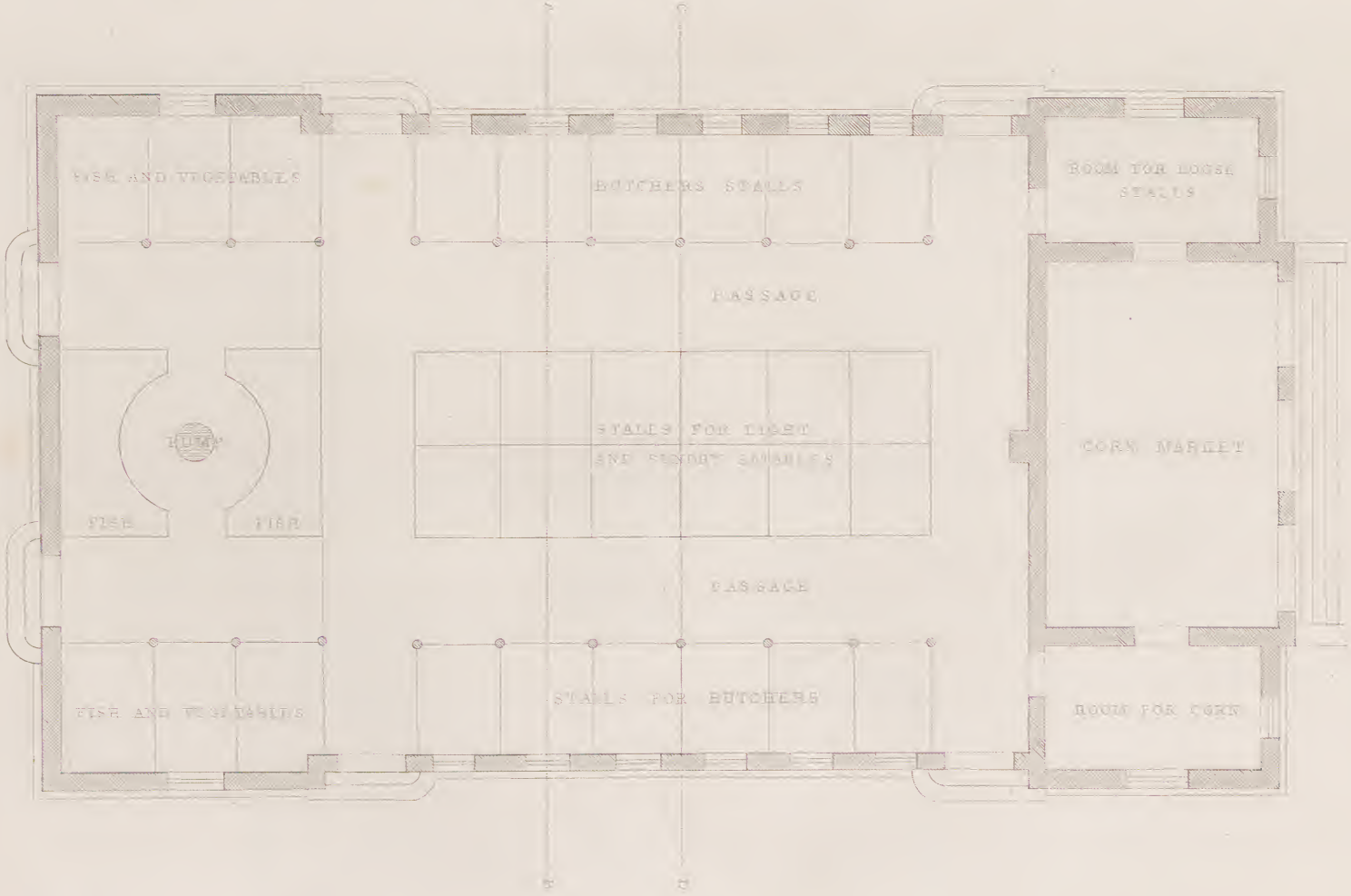
CHAMBER FLAT



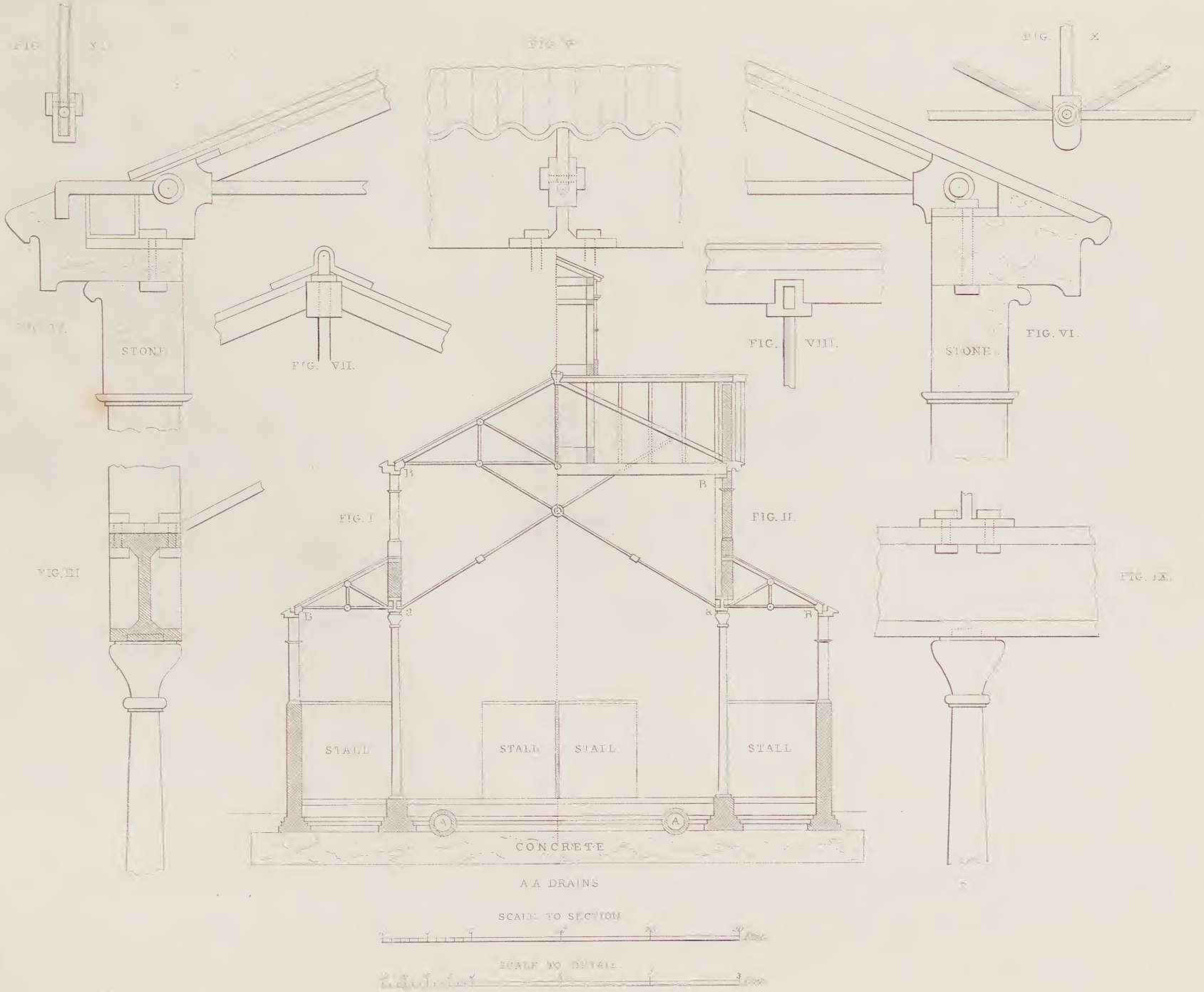
SCALE OF FEET

PERSPECTIVE VIEW

GROUND PLAN



SCALE OF FEET.



A A DRAINS

SCALE TO SECTION

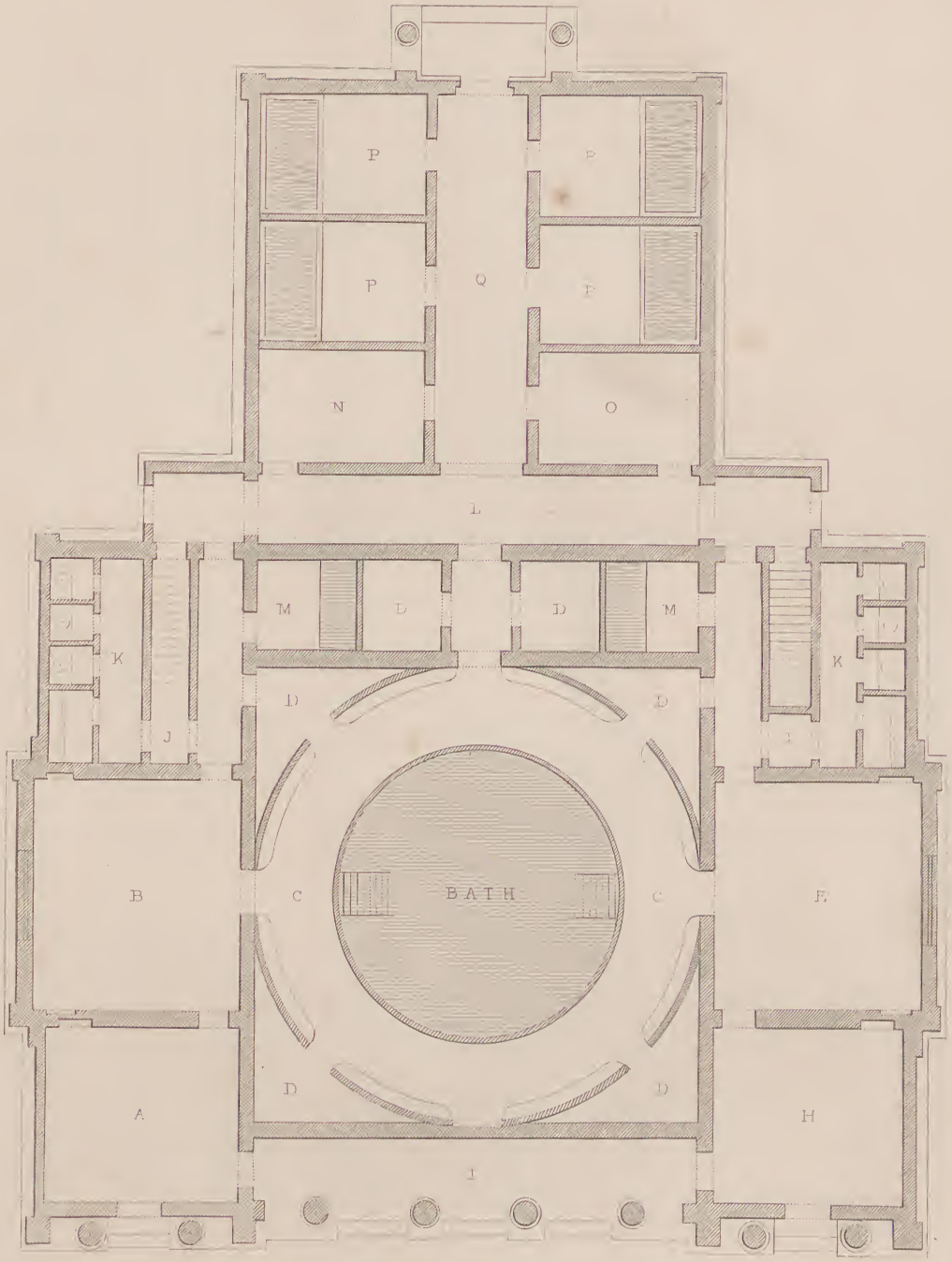
SCALE TO DETAIL

LONDON: THOMAS DALLY 1852

PERSPECTIVE VIEW

LONDON THOMAS KELLY 1827

GROUND PLAN



SCALE OF FEET

LONDON THOMAS KELLY 1827

FIG IV

FIG V

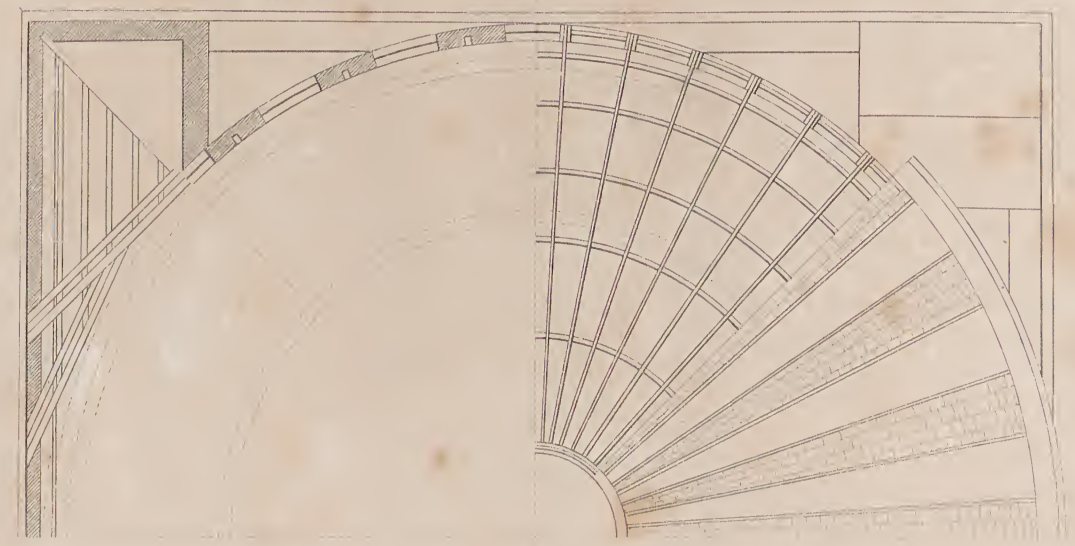


FIG III

FIG VI

SCALE OF FEET

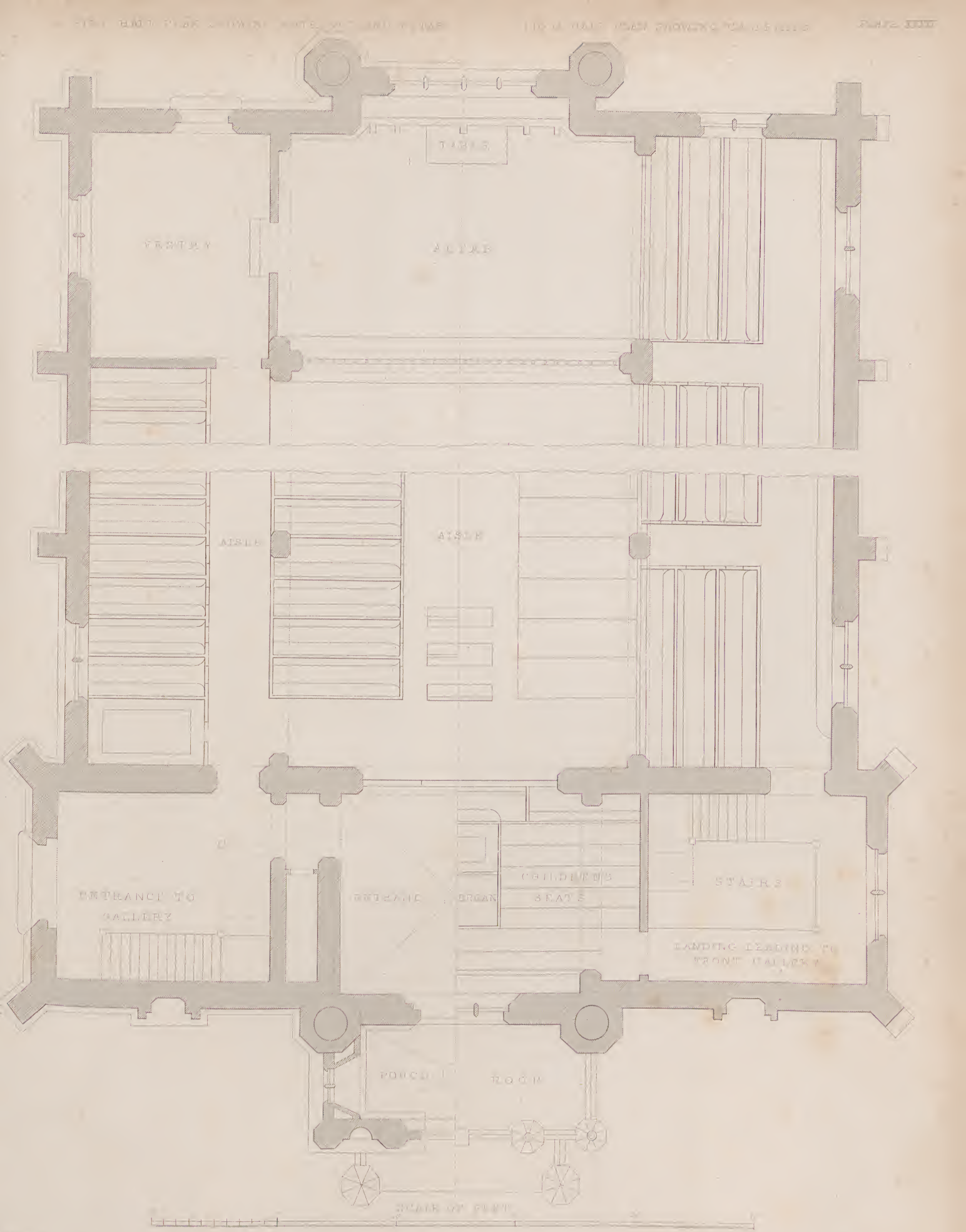


TABLE
VESTRY
ALTAR
AISLE
AISLE
ENTRANCE TO GALLERY
CHILDREN'S SEATS
STAIRS
LANDING LEADING TO FRONT GALLERY
PORCH
ROOM
SCALE OF FEET

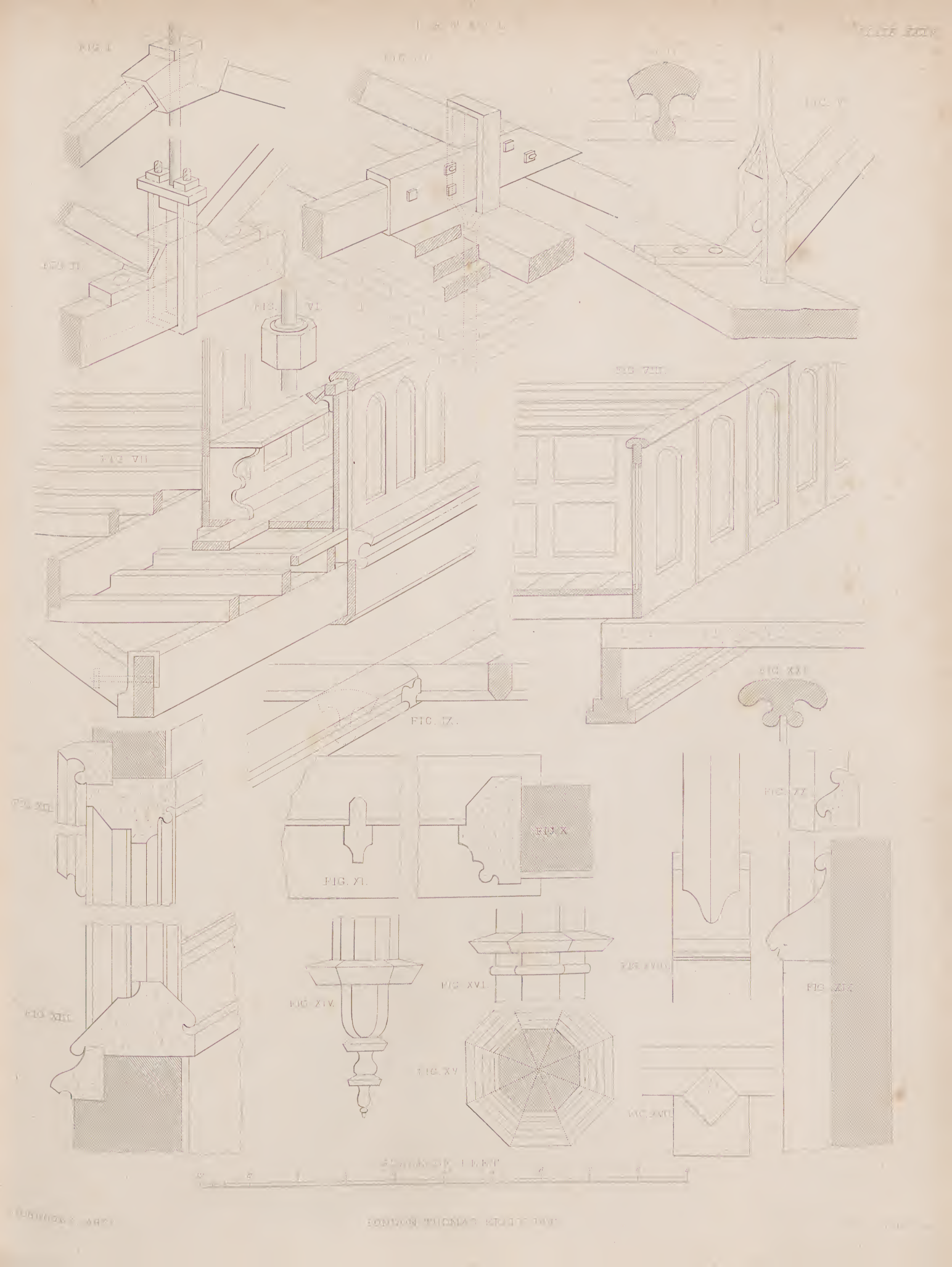


FIG. I.
FIG. II.
FIG. III.
FIG. IV.
FIG. V.
FIG. VI.
FIG. VII.
FIG. VIII.
FIG. IX.
FIG. X.
FIG. XI.
FIG. XII.
FIG. XIII.
FIG. XIV.
FIG. XV.
FIG. XVI.
FIG. XVII.
FIG. XVIII.
FIG. XIX.
FIG. XX.
FIG. XXI.

FIG. I.

FIG. VII.

FIG. VI.

FIG. IX.

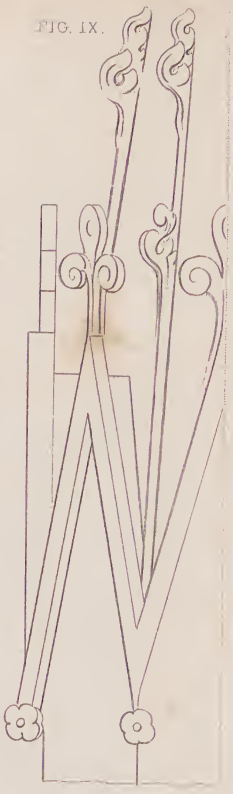


FIG. V.

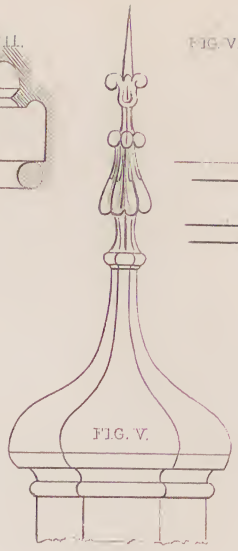


FIG. II.

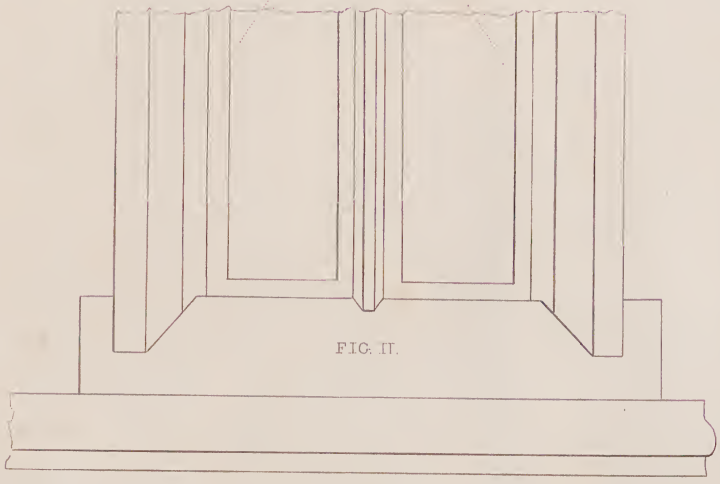


FIG. IV.

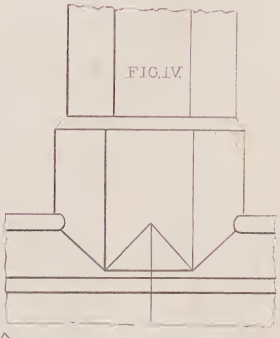


FIG. III.

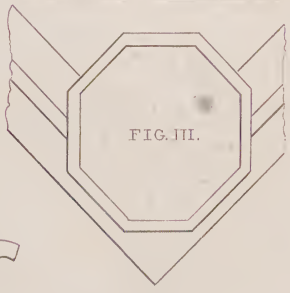


FIG VIII.

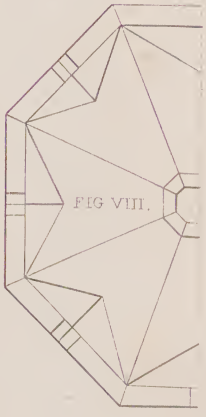


FIG. X.

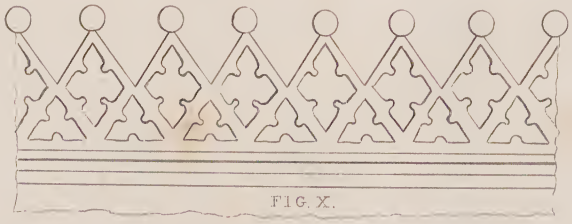


FIG. XI.

FIG. XIV.

FIG. XII.

FIG. XIII.

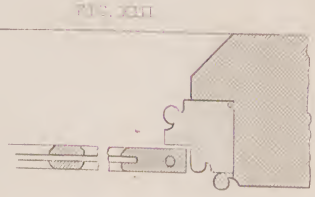
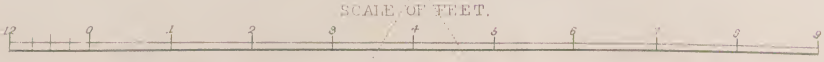


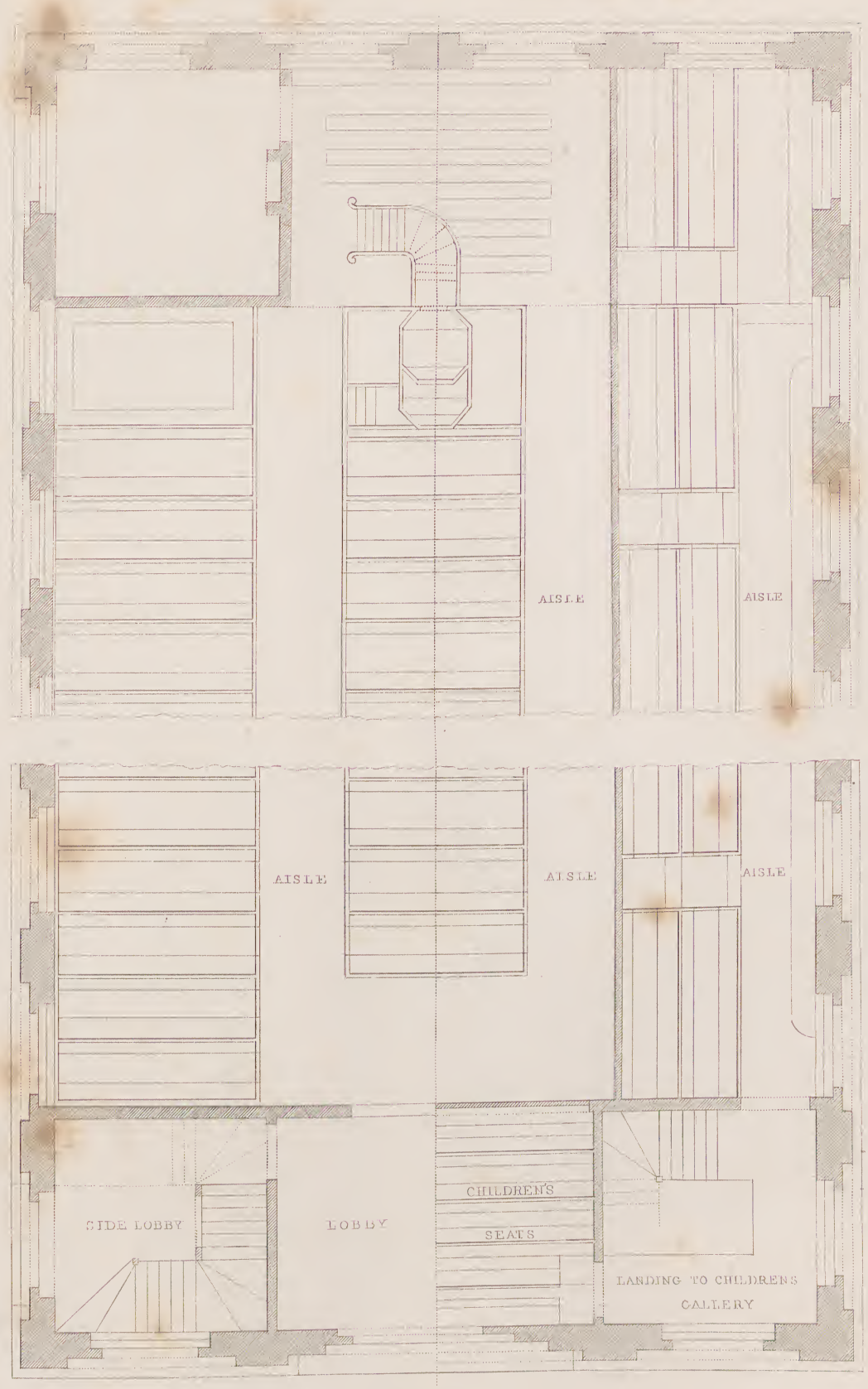
FIG. XV.

SCALE OF FEET.



LONDON: THOMAS KELLY, 1842.

PERSPECTIVE VIEW



SCALE OF FEET

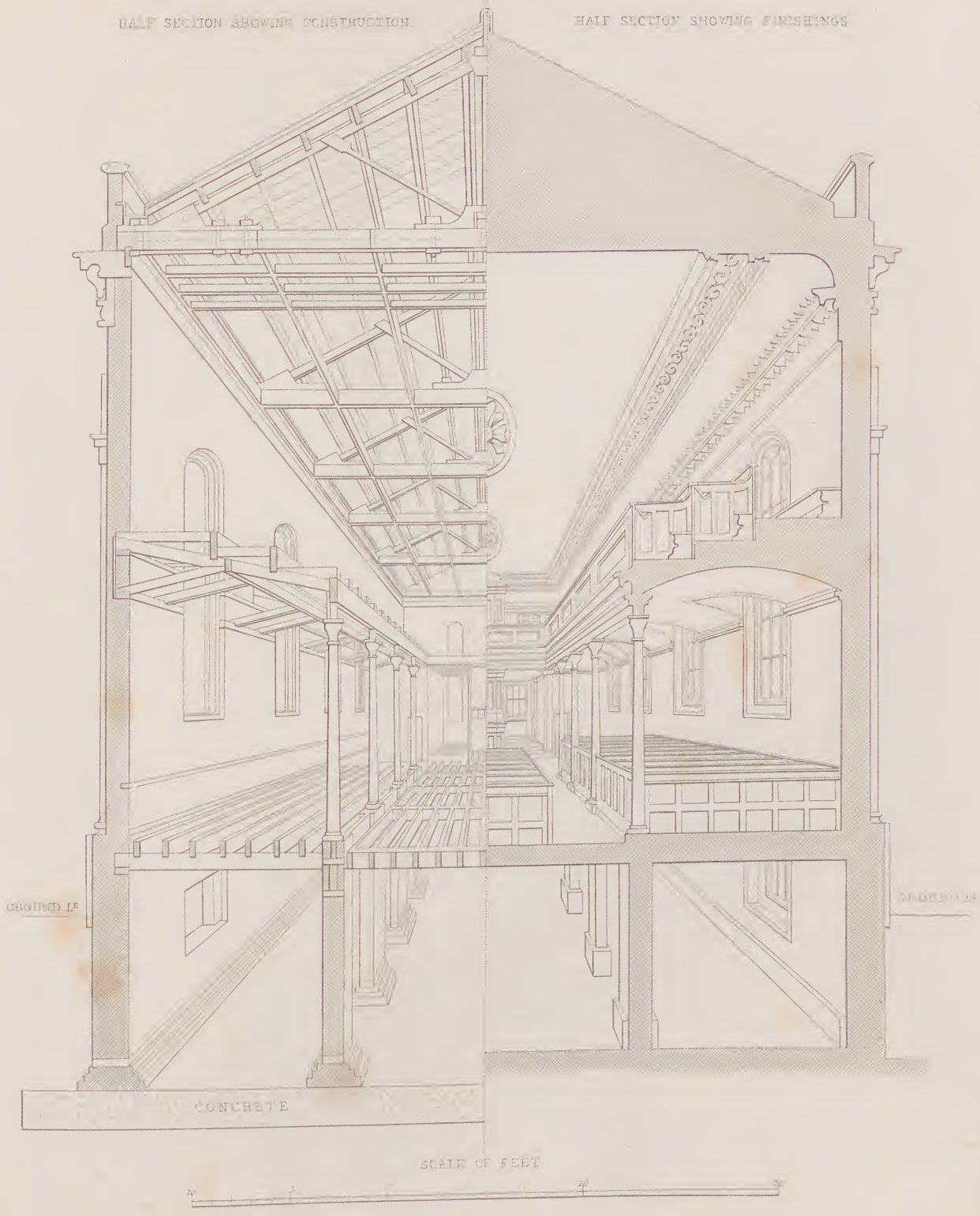
LONDON. THOMAS KELLY. 1842.

FIG. I

HALF SECTION SHEWING CONSTRUCTION.

FIG. II

HALF SECTION SHOWING FINISHINGS



SCALE OF FEET

10 5 0 10 20

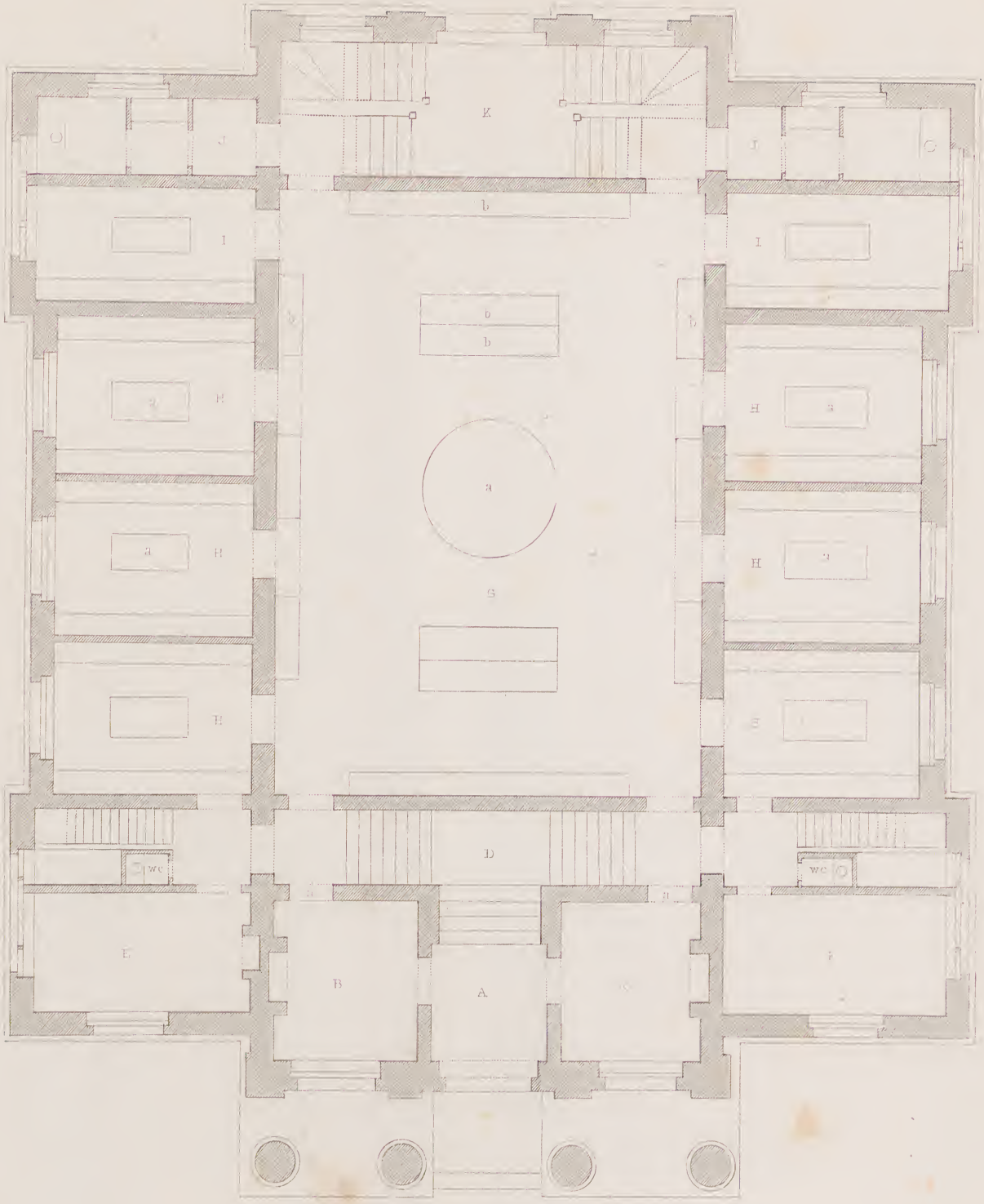
S. B. BROOKS ARCT.

LONDON THOMAS KELLY. 1842.

E. ACKARD SC.

PERSPECTIVE VIEW

T. HARRIS ARCH. LONDON. THOMAS GRAVES 1842 H. ADLARD SC.



SCALE OF FEET.

FIG I.

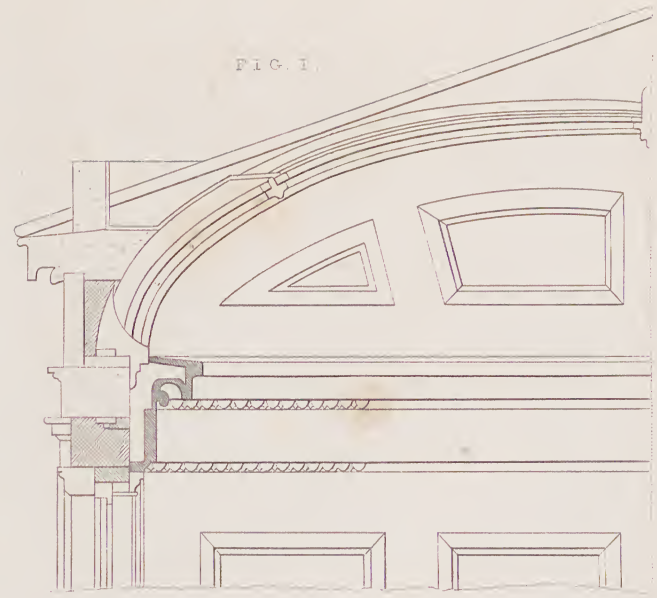


FIG II.

FIG III

FIG IV

FIG V

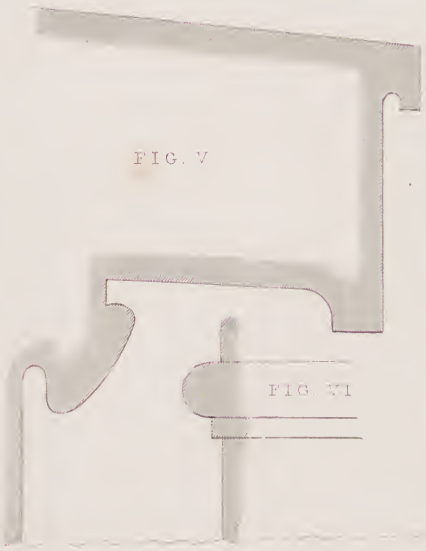


FIG VI

FIG VII

FIG VIII

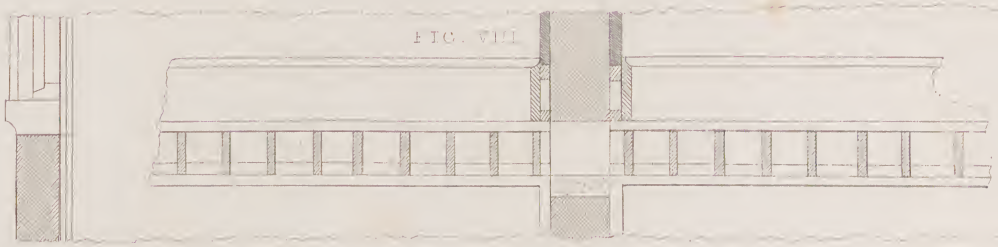


FIG IX

SCALE OF SECTION.

SCALE OF DETAIL.

T. BROOKS, ARCT

LONDON: EDWARD KELLY, 1843

PERSPECTIVE VIEW

LONDON THOMAS KELLY 1842

PRINCIPAL PLAN OF HOTEL

SCALE OF FEET

0 1 3 10 20 30 40 50

DETAILS OF HOTEL.

FIG I. HALF ELEVATION OF PRINCIPAL ENTRANCE.

FIG II. SECTION.

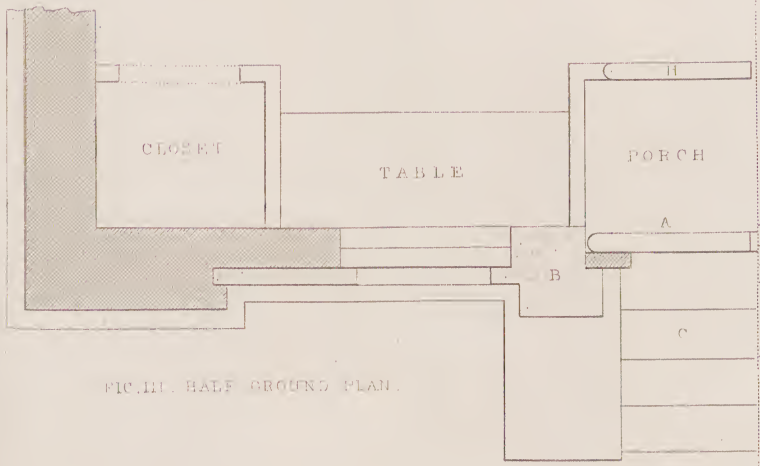


FIG. III. HALF GROUND PLAN.

FIG. IV. HALF CHAMBER PLAN

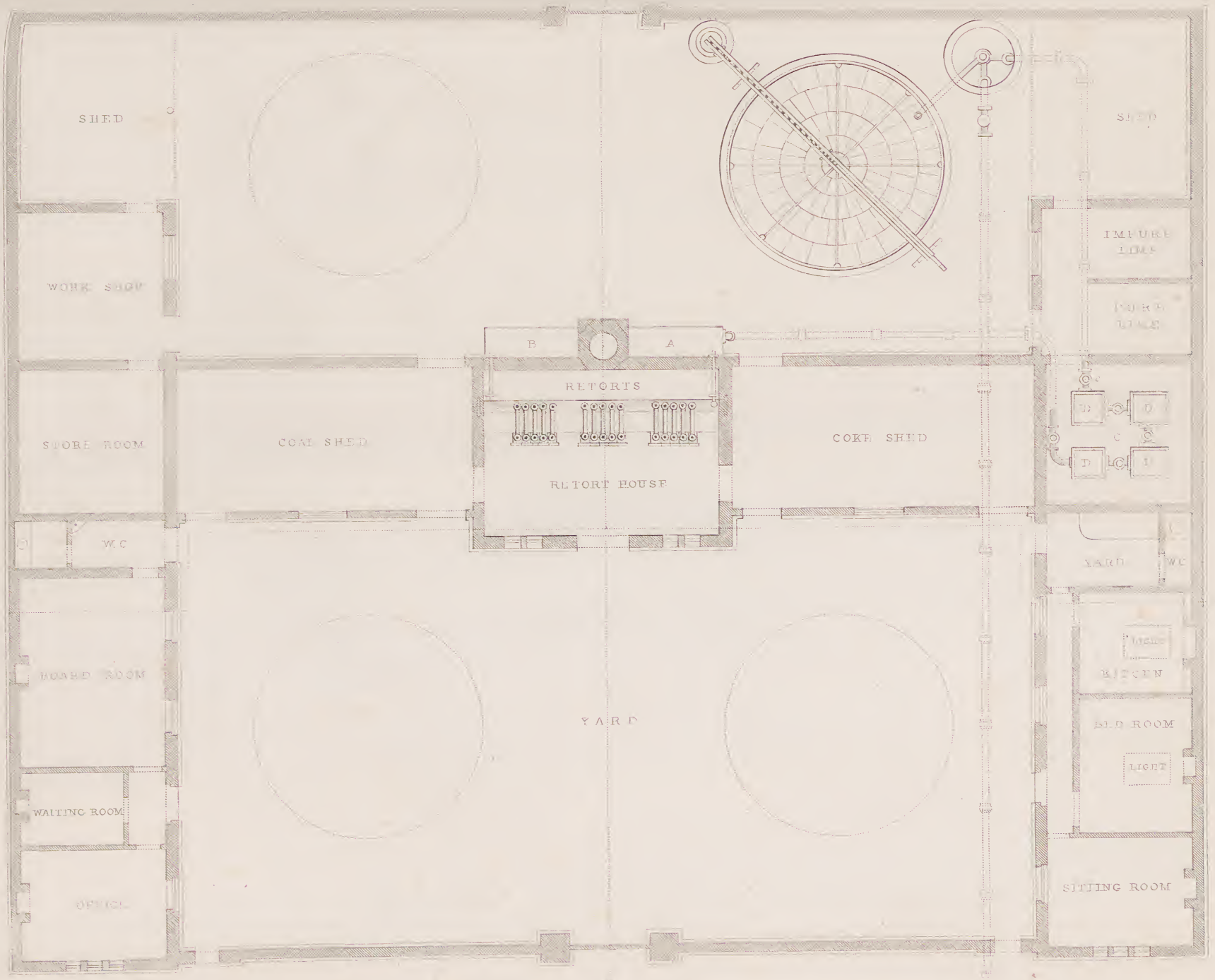
SCALE OF FEET

LONDON: THOMAS KELLY, 1842.

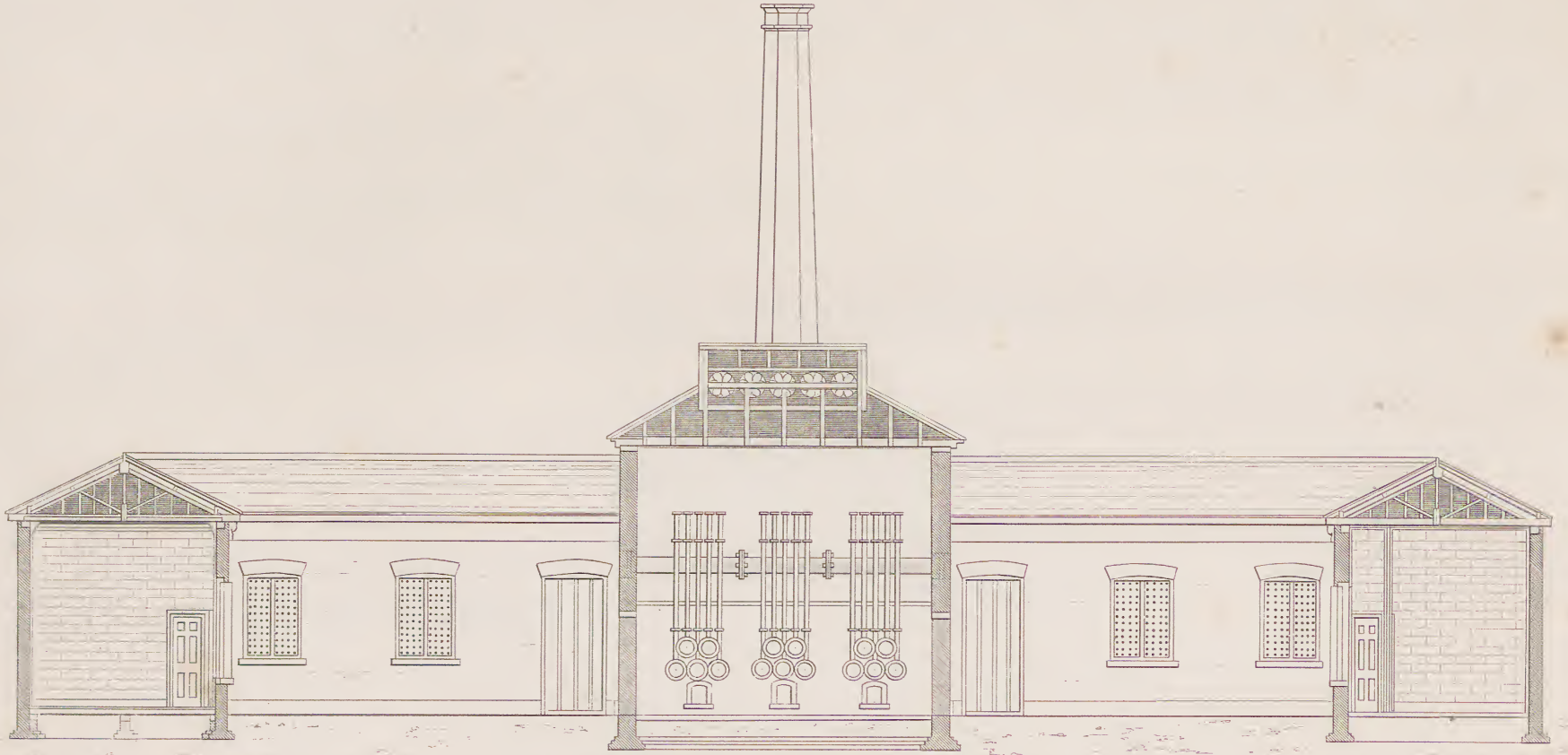
ENTRANCE ELEVATION

SCALE OF FEET

LONDON: THOMAS RILEY 1851


SHED
WORK SHOP
STORE ROOM
W.C
BOARD ROOM
WAITING ROOM
OFFICE
COAL SHED
B
A
RETORTS
RETORT HOUSE
COKE SHED
YARD
SHED
IMPURE LIME
PURE LIME
D
C
YARD
W.C
KITCHEN
BED ROOM
LIGHT
SITTING ROOM
SCALE OF FEET

LONGITUDINAL SECTION, A. F

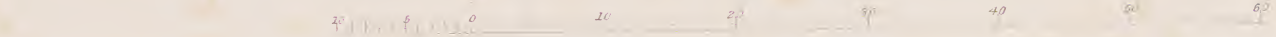


SCALE OF FEET

BOSTON, THOMAS KELLY, 1849

TRANSVERSE SECTION C.D.

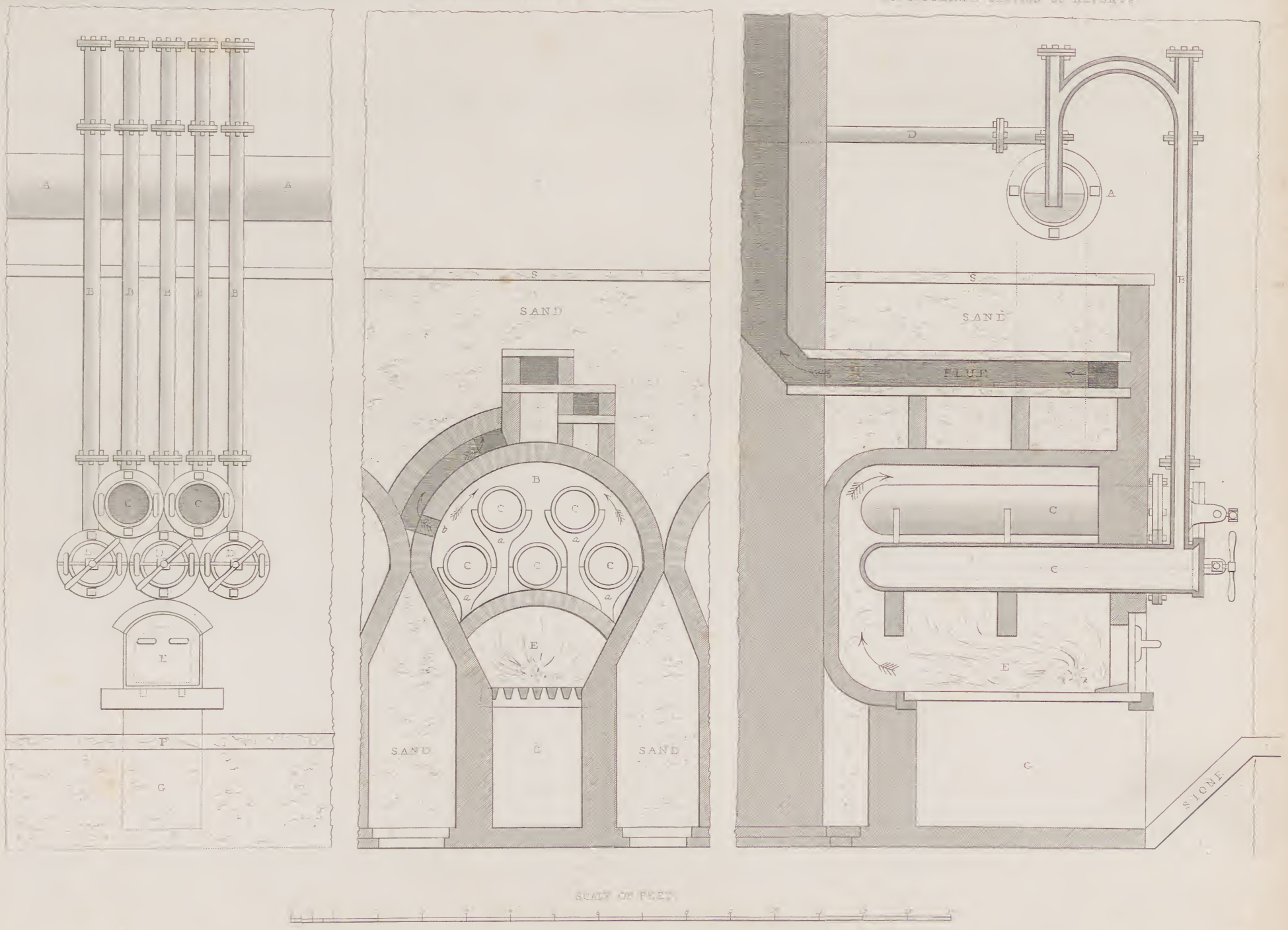
SCALE OF FEET

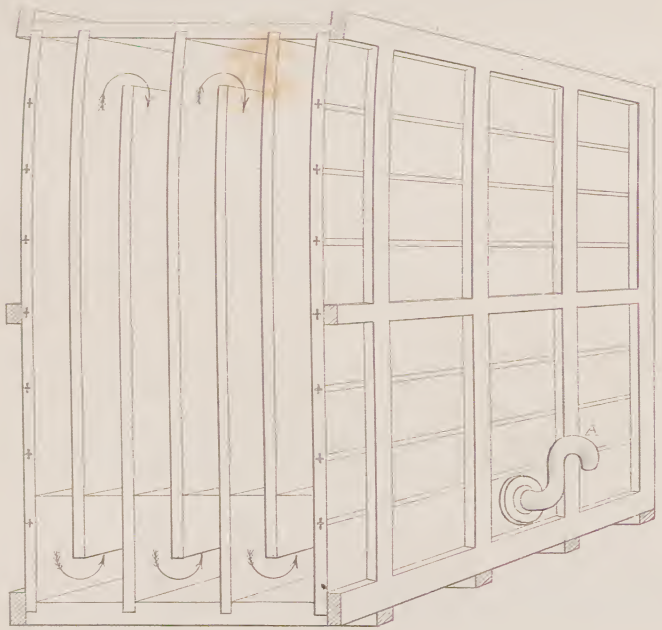


S.T. BROOKES, ARCT

LONDON: THOMAS M'LEAN, 1842

H. ADLARD, SC.


A
A
B
B
B
B
B
C
C
E
F
G
S
SAND
B
C
C
C
C
C
a
a
a
a
b
E
SAND
SAND
D
A
S
SAND
B
PLUG
C
C
E
C
STONE
SCALE OF FEET



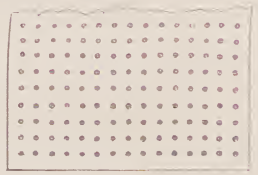


FIG. II

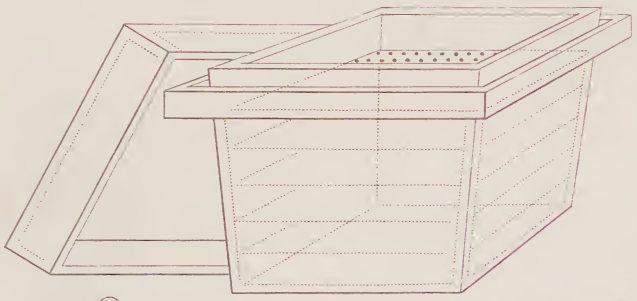


FIG. III.

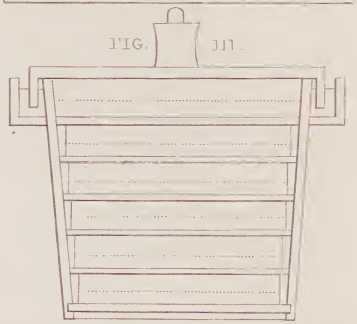


FIG. VIII.

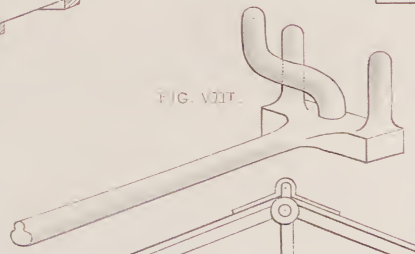


FIG. VI.

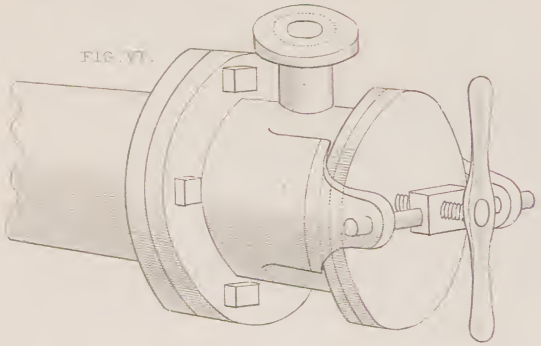
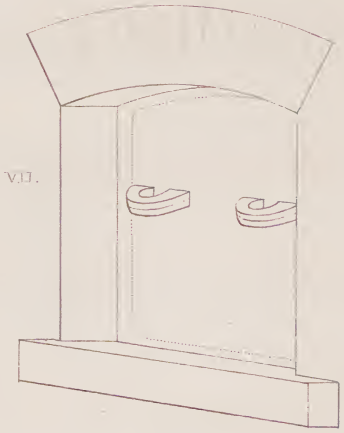


FIG. VII.



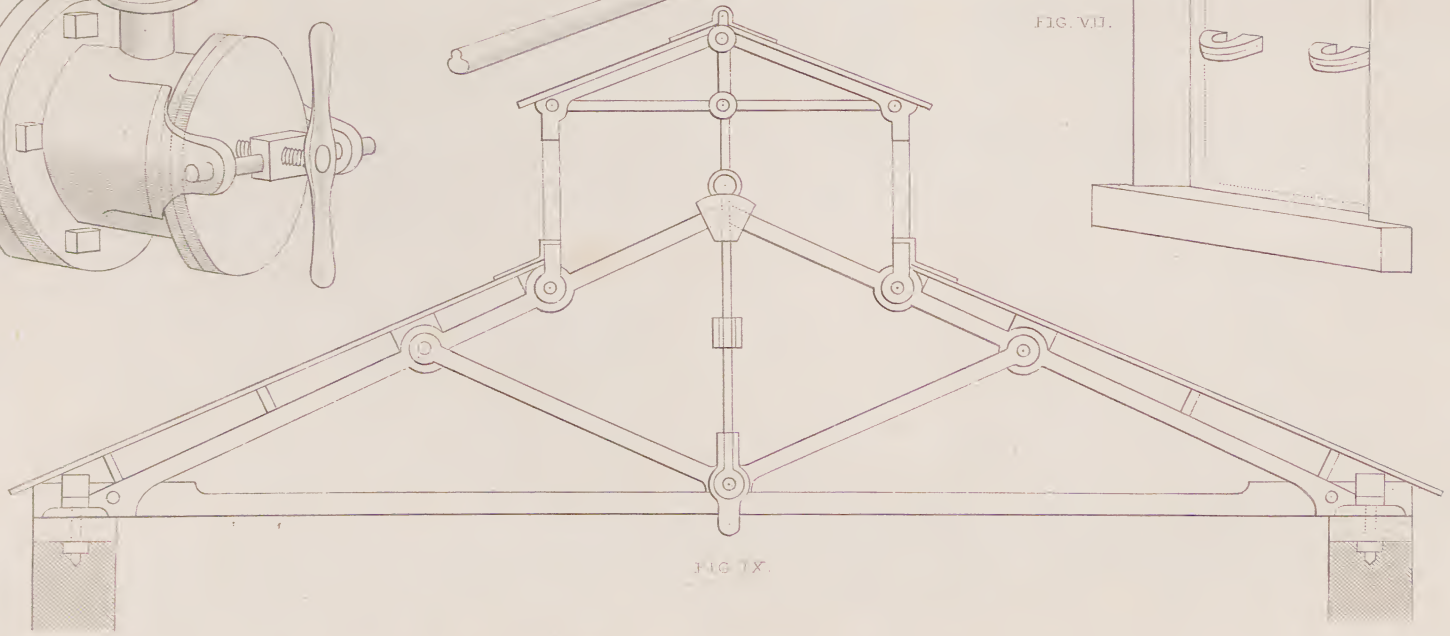


FIG. IX.

SCALE OF FEET.

PERSPECTIVE VIEW

DRAWN BY THOMAS ARMY 1824

ENGRAVED BY

PLATE VIII.

PLAN FOR A MARKET, ENGINE AND STATION HOUSE.

FIG I.

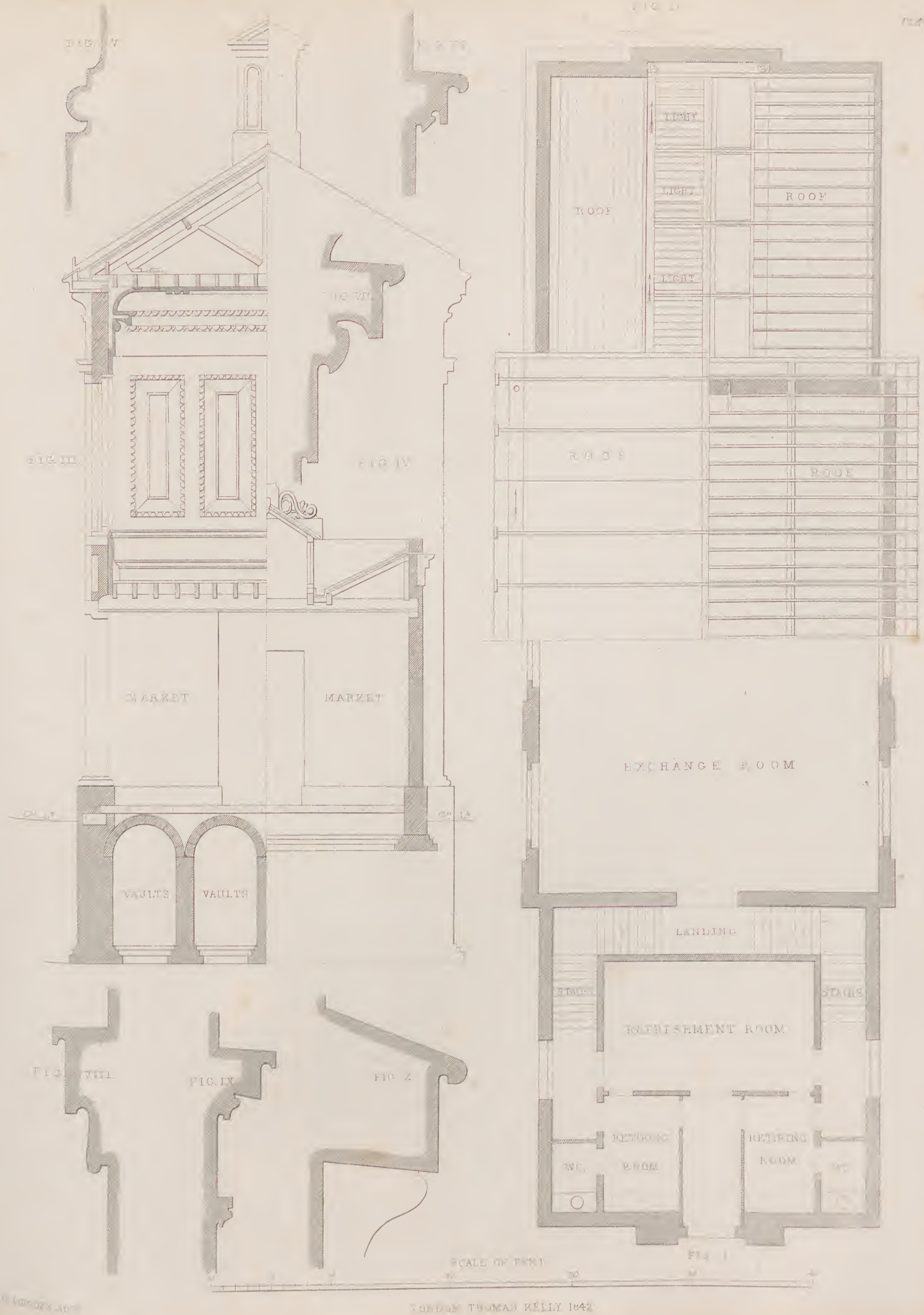
FIG II.

SCALE OF FEET

J. BROOKS, ARCT.

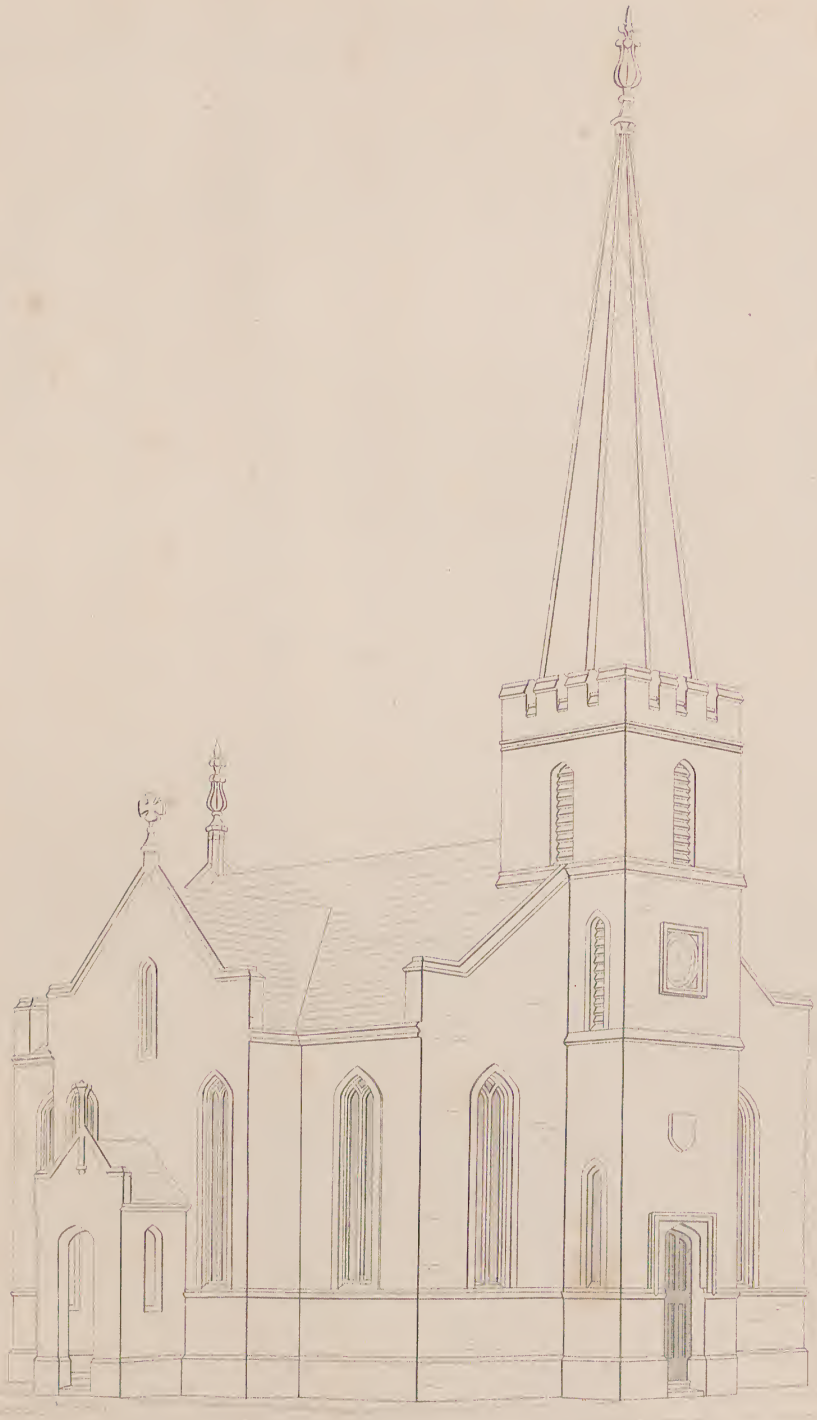
LONDON: THOMAS KELLY, 1842.

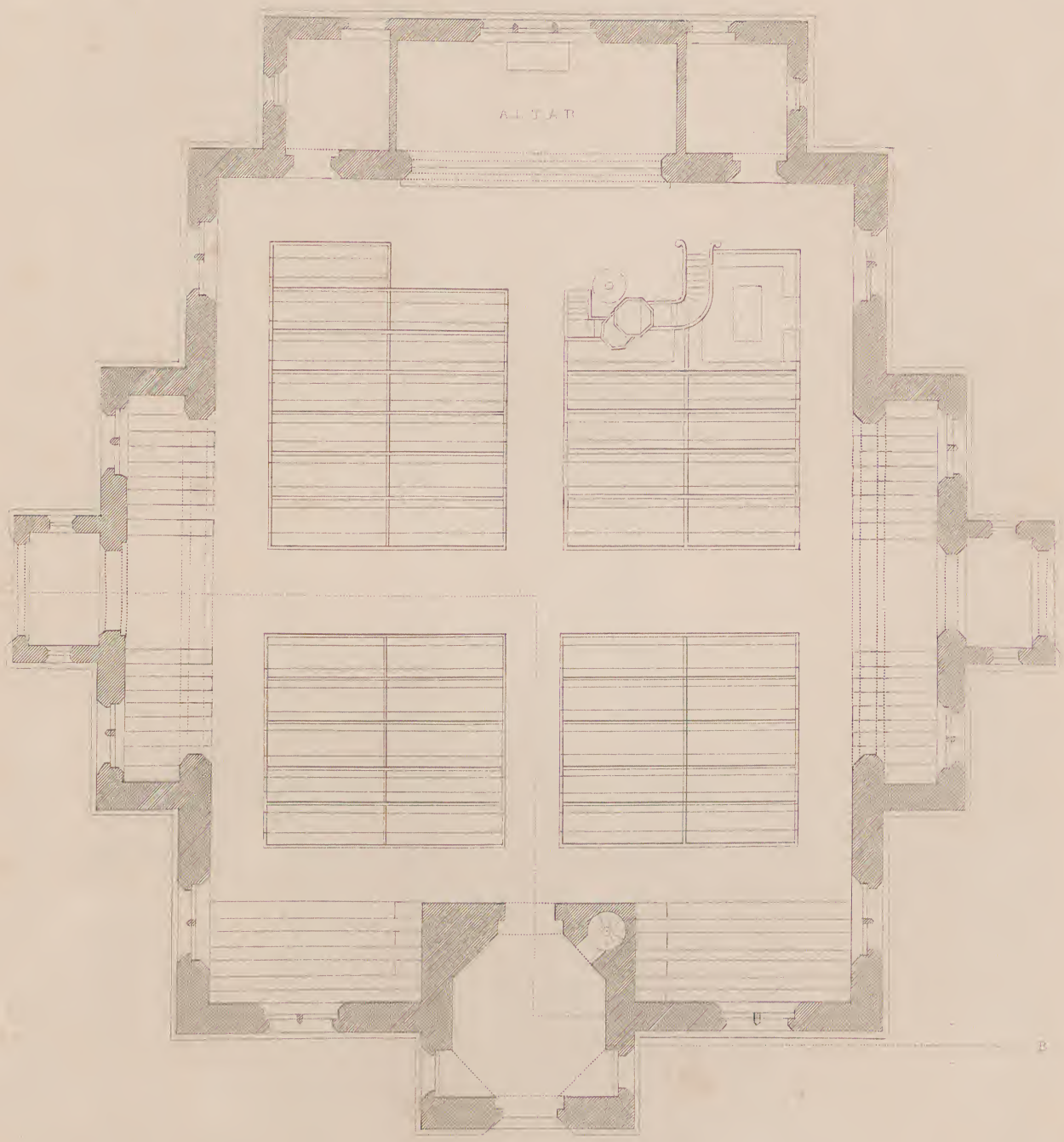
W. ALLEN, SC.



LONDON: THOMAS KELLY 1842

PERSPECTIVE VIEW.



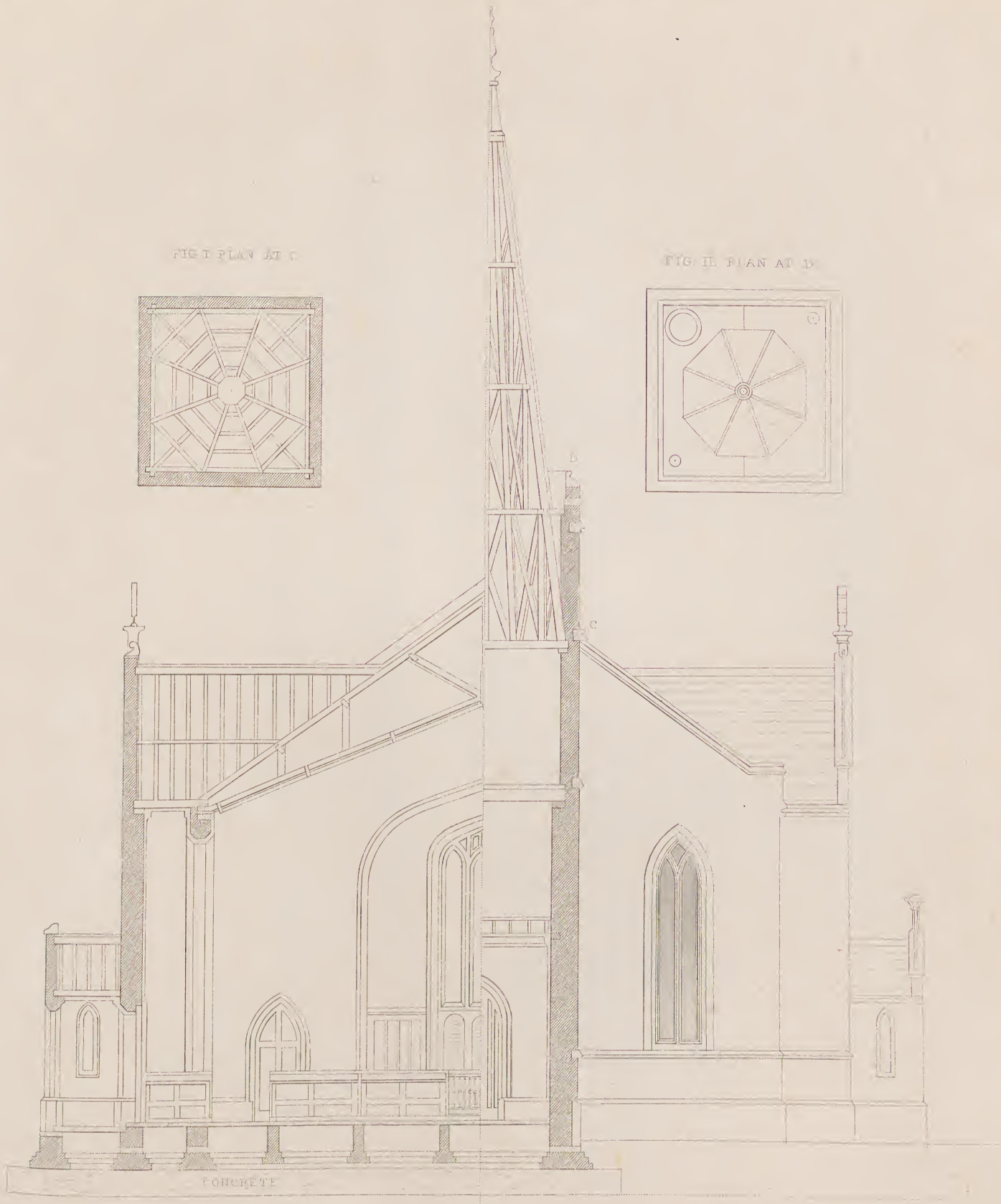


SCALE OF FEET

SECTION ON LINE A.B. SEE GROUND PLAN.

FIG. I. PLAN AT C.

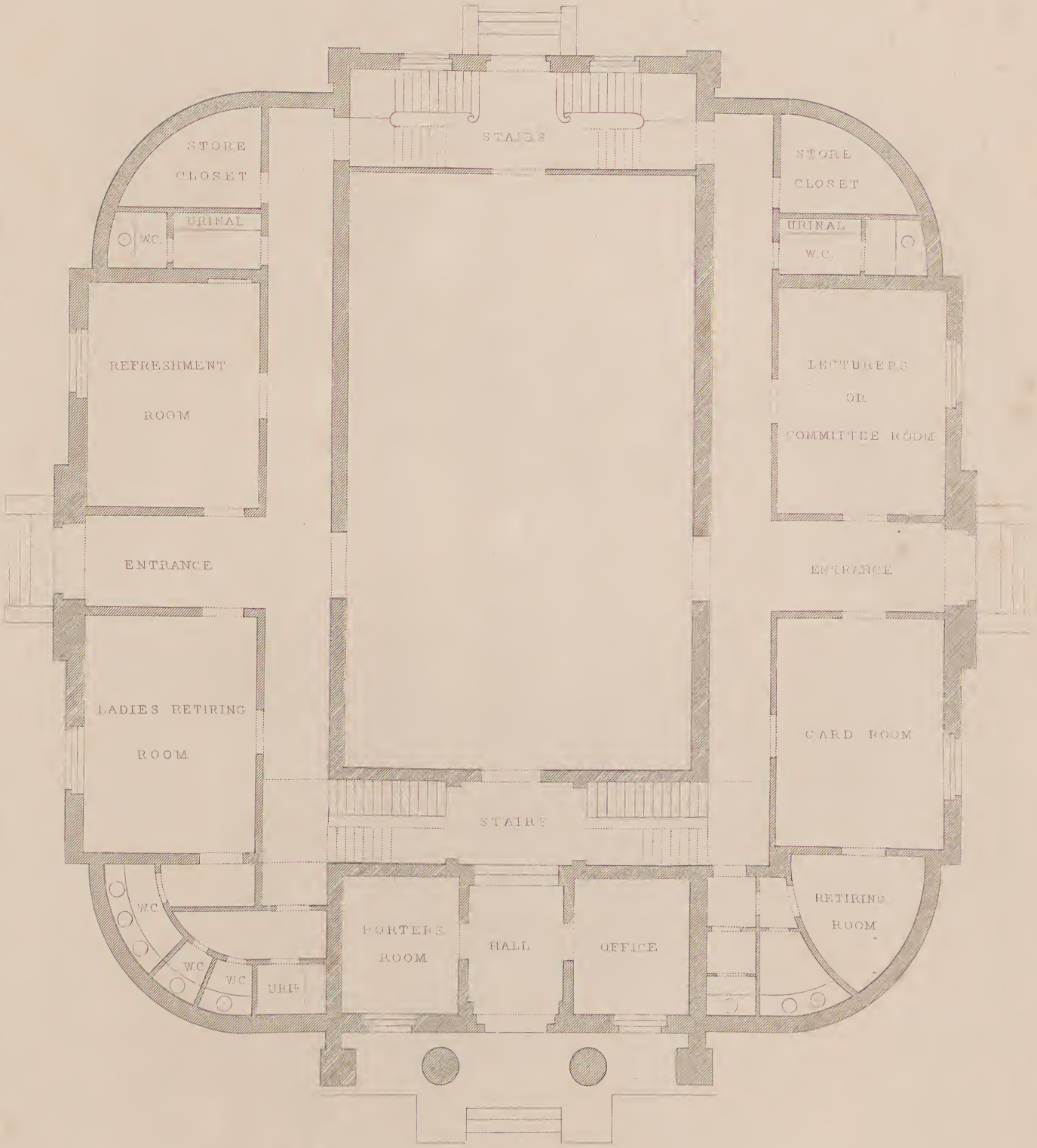
FIG. II. PLAN AT D.



PERSPECTIVE VIEW

OF A DESIGN FOR A MUSIC HALL OR PUBLIC ROOMS.

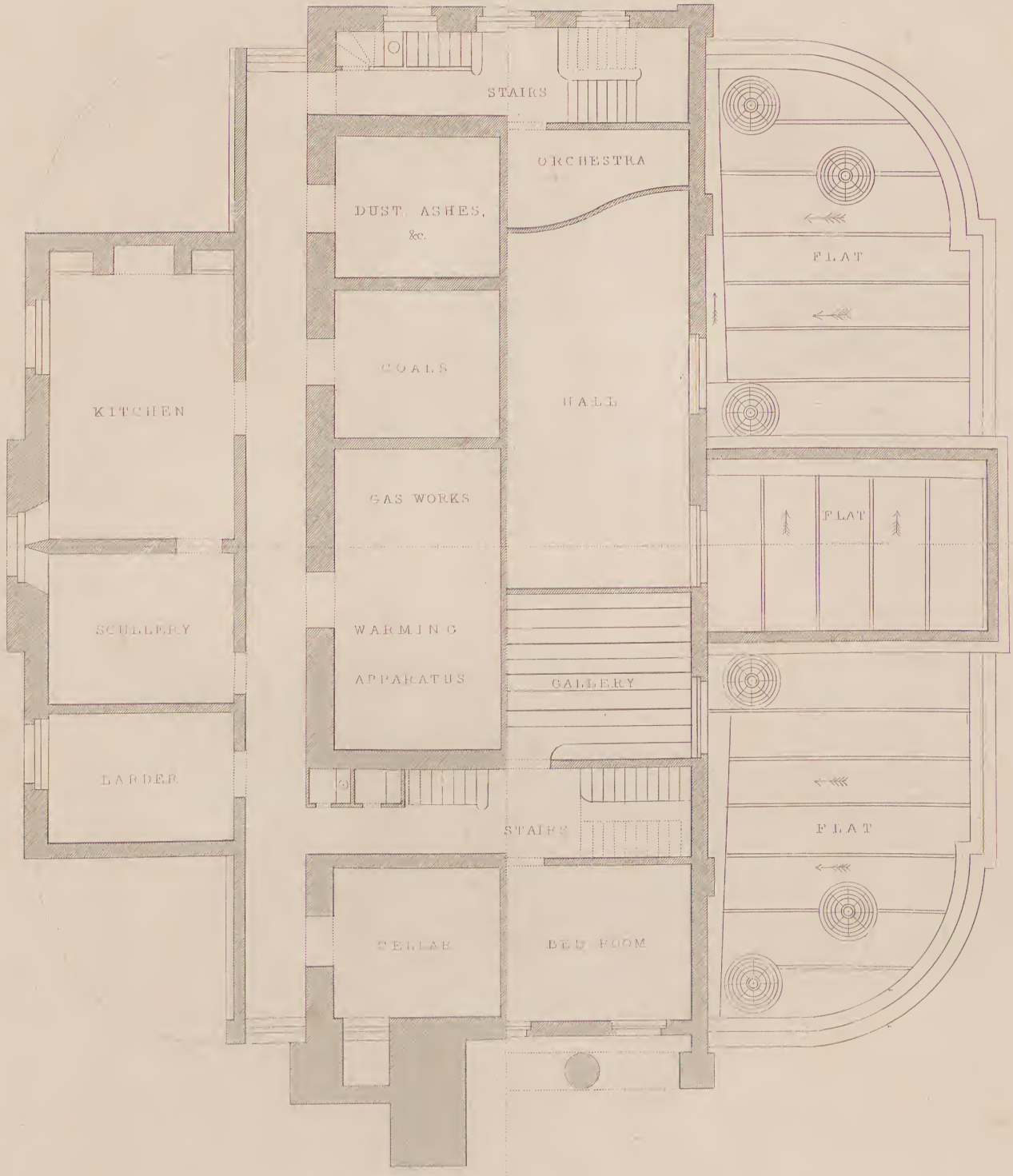
PRELIMINARY PLAN OF A DIVISION FOR A MUSIC HALL OR PUBLIC ROOMS



SCALE OF FEET

FIG. I. HALF PLAN OF BASEMENT.

FIG. II. HALF PLAN OF HALL AND ROOFS.



SCALE OF FEET.

LONDON: THOMAS KELLY 1842

FIG. I. HALF PLAN OF BASEMENT.

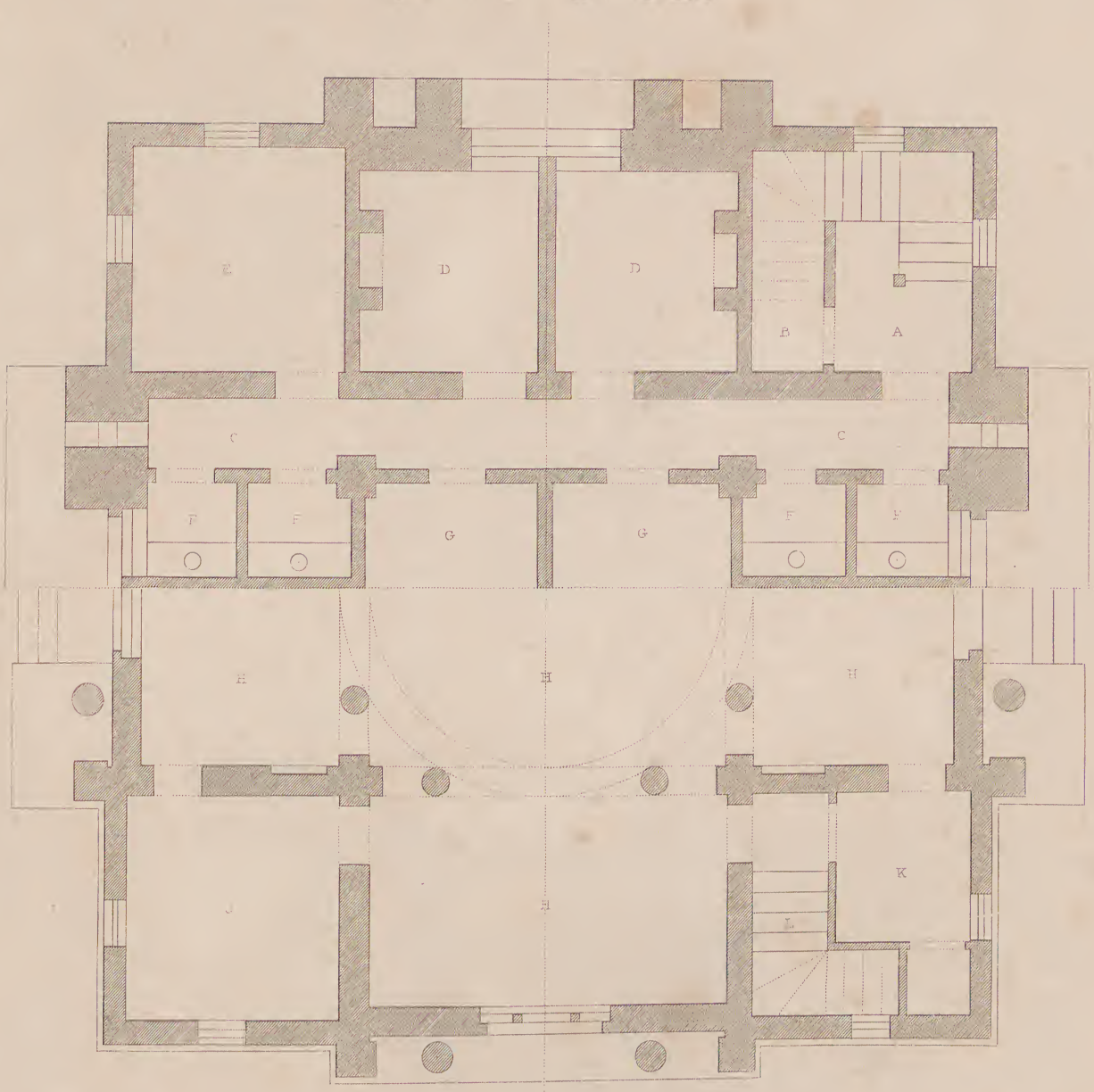


FIG II. HALF PLAN OF GROUND OR PRINCIPAL STORY

SCALE OF FEET

FIG. XVII.

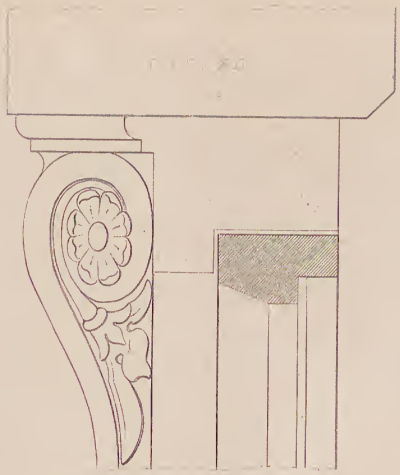


FIG. XIII.

FIG. XVI.

FIG. XIV.

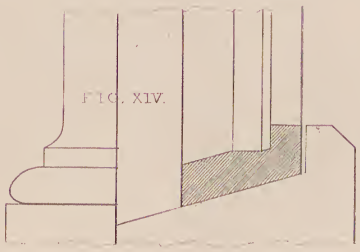


FIG. XV.

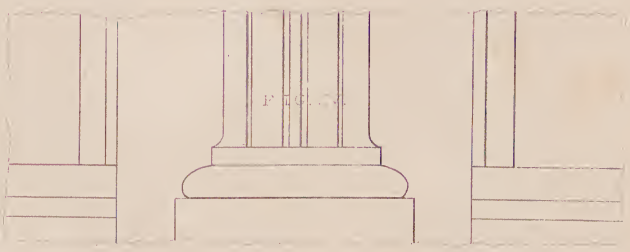
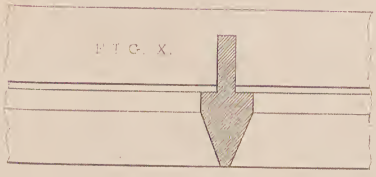


FIG. X.



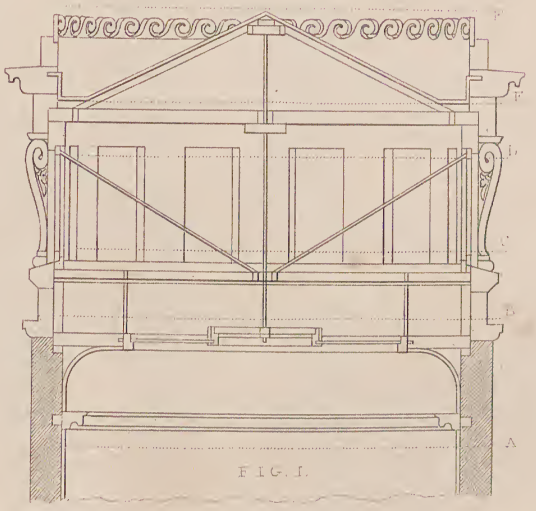


FIG. I.

FIG. XI.

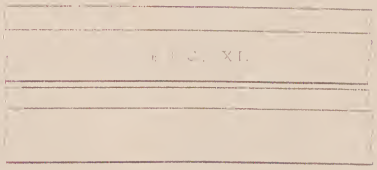


FIG. VIII

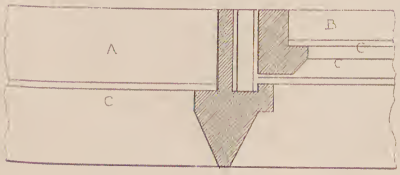


FIG. V.

FIG. III.

FIG. IX.

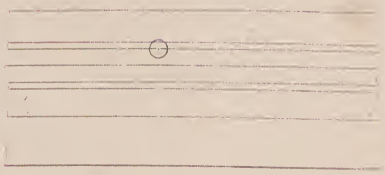


FIG. VII.

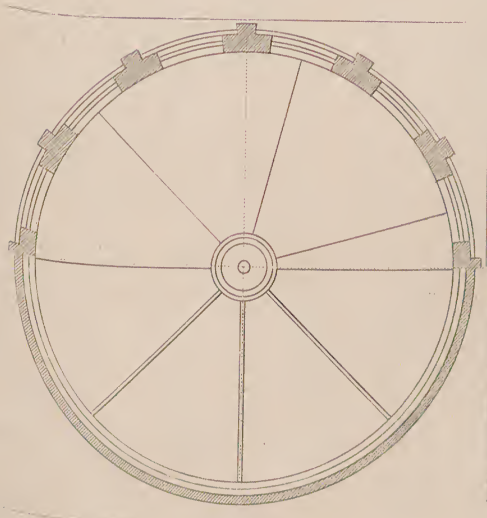


FIG IV

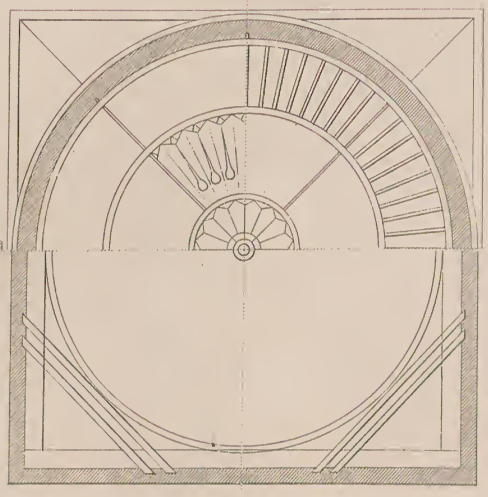
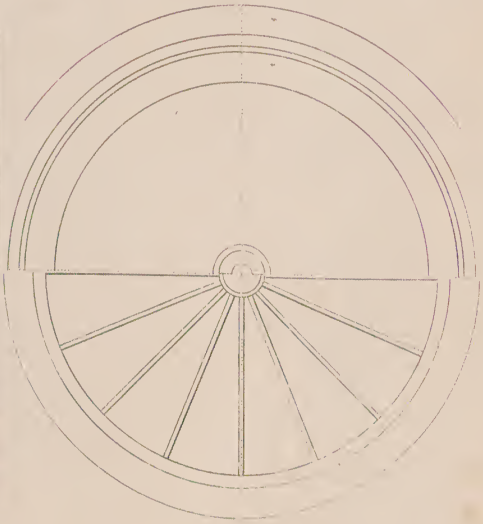


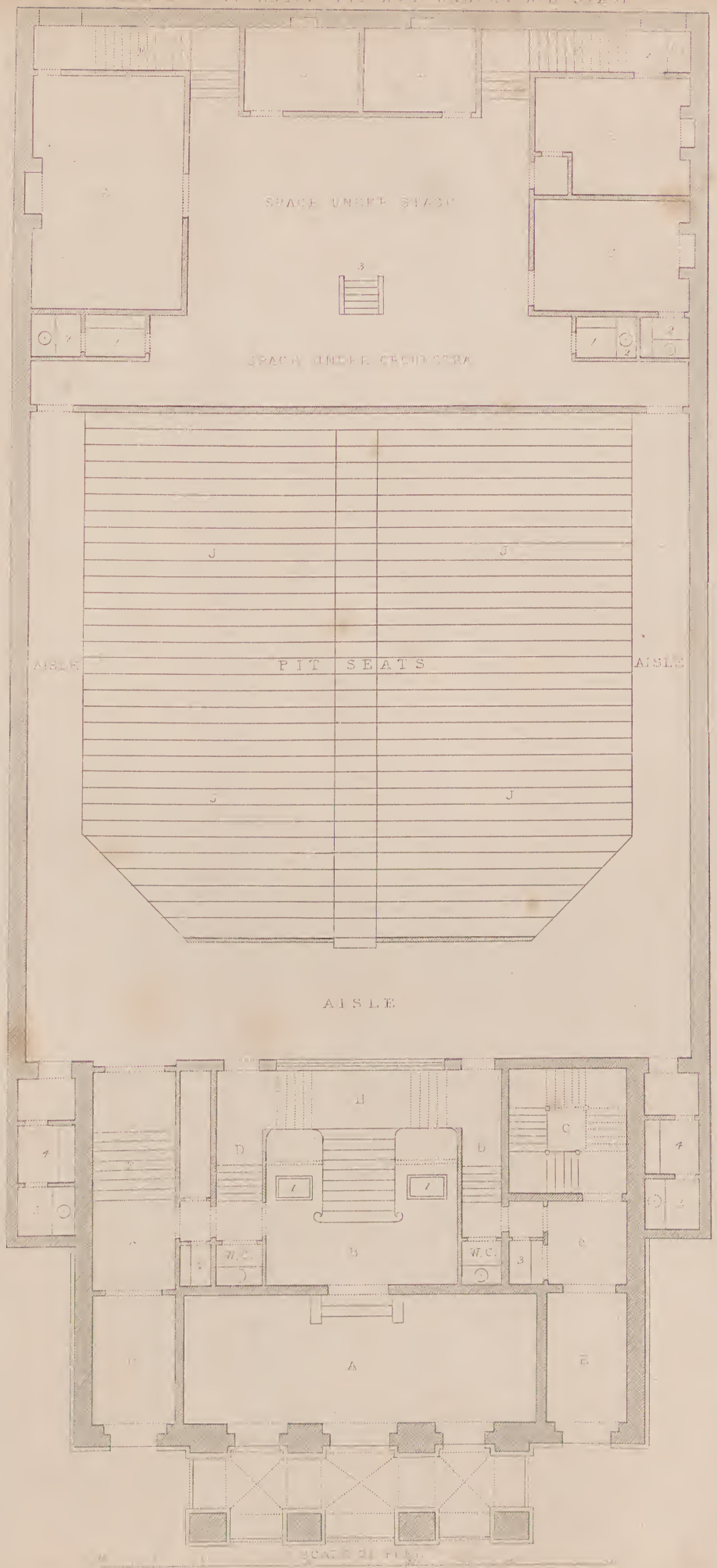
FIG II

SCALE OF FEET

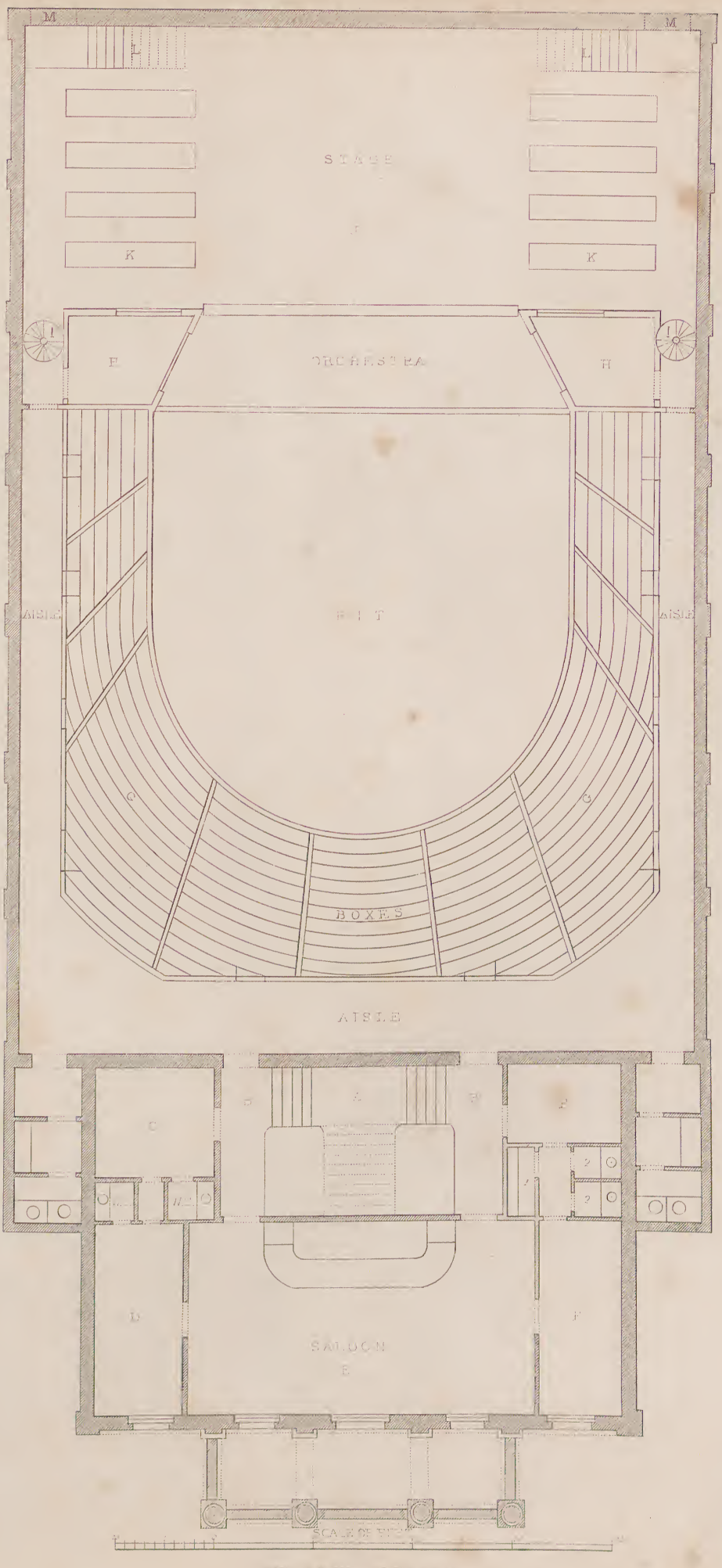


ELEVATION OF A DESIGN FOR A SMALL THEATRE.

PLAN OF ENTRANCES, PIT AND UNDERNEATH STAGE



PLAN OF SALOONS, BOXES AND STAGE.

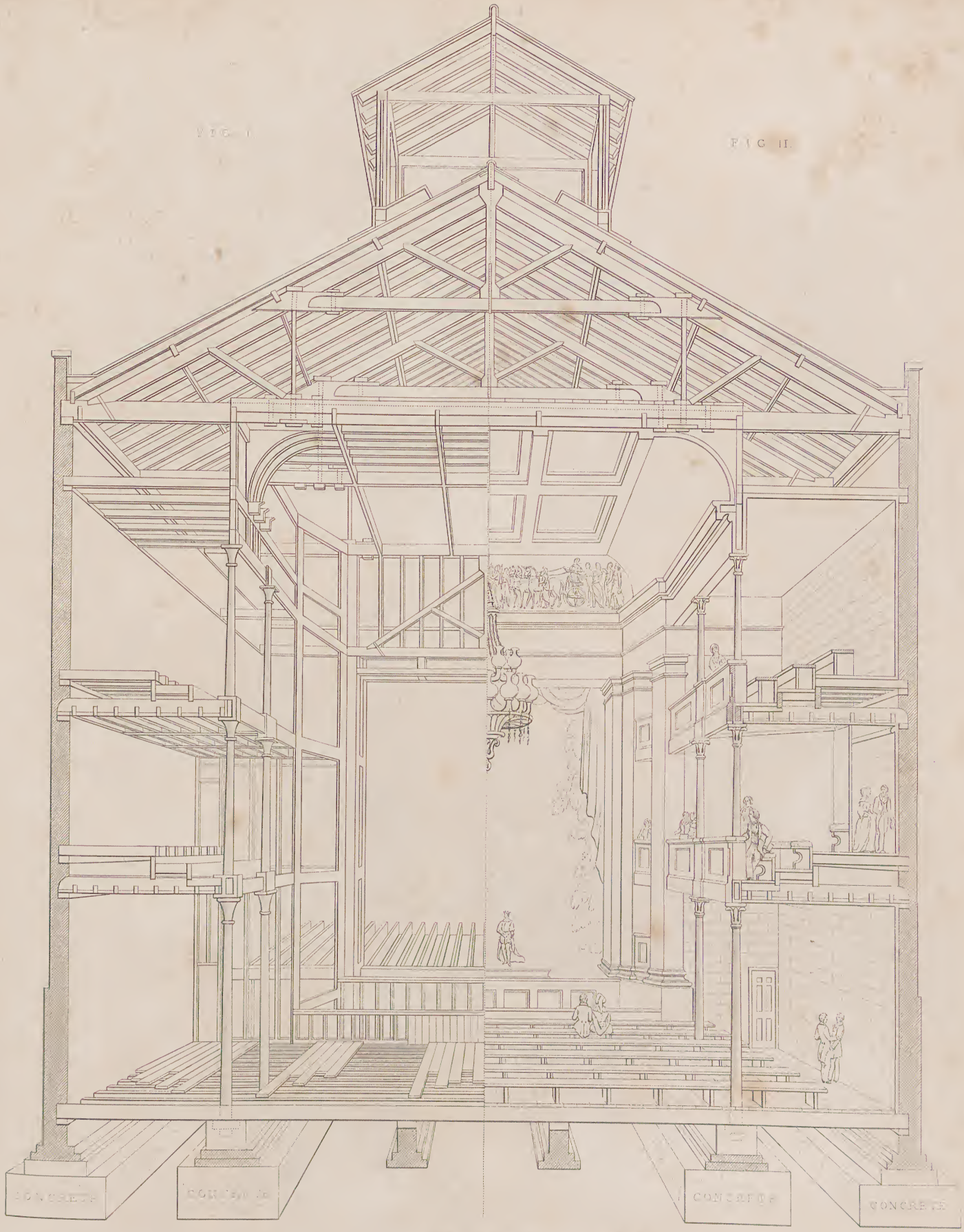


LONDON THOMAS KELLY, 1842.

TRANSVERSE SECTION

FIG. I.

FIG. II.



SCALE OF FEET.

LONDON THOMAS KELLY 1849

FIG. V.

FIG. VI

FIG. VII

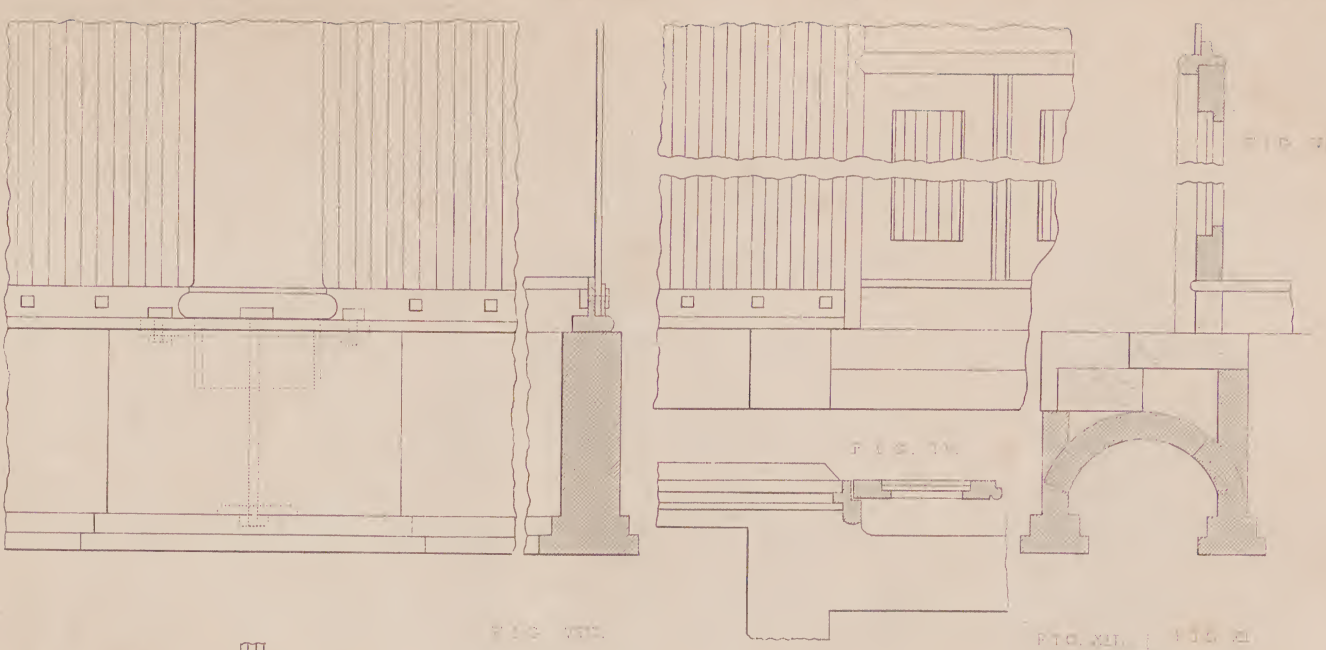
FIG. VIII

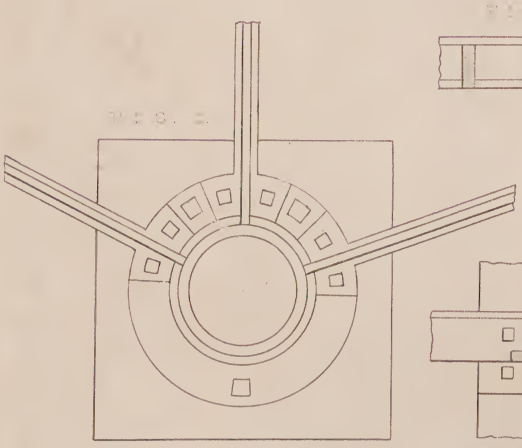
AISLE

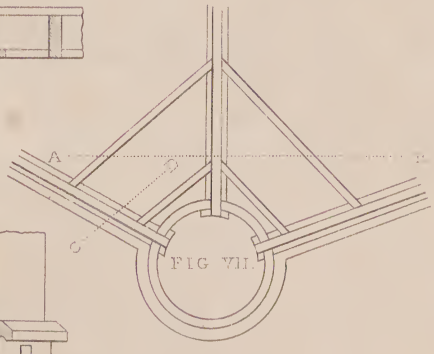
AISLE

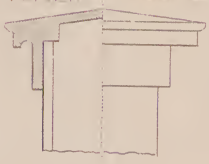
ROOF

SCALE OF FEET









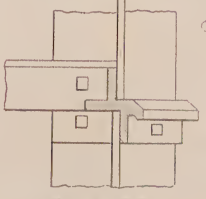


FIG. IX.

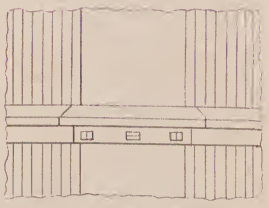
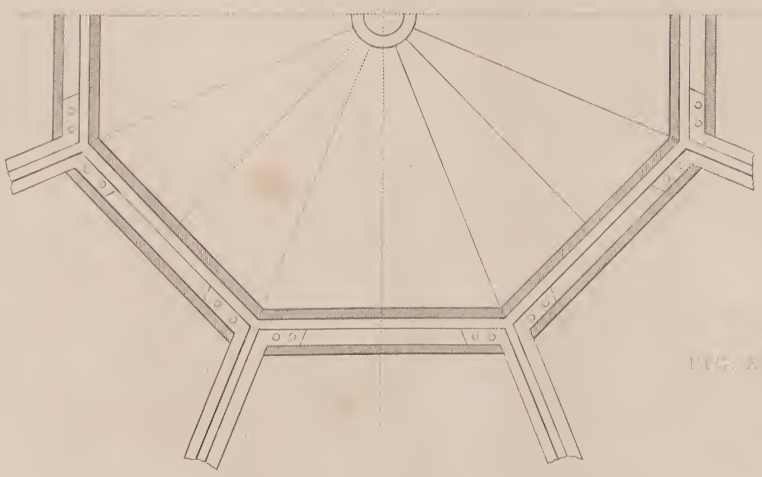
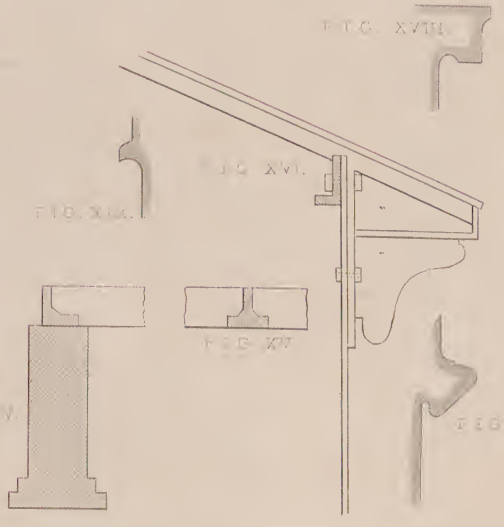


FIG. X.

FIG. XIII.





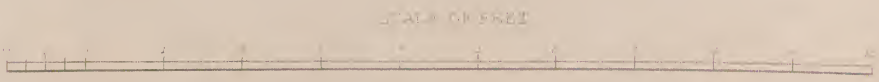


FIG. I.

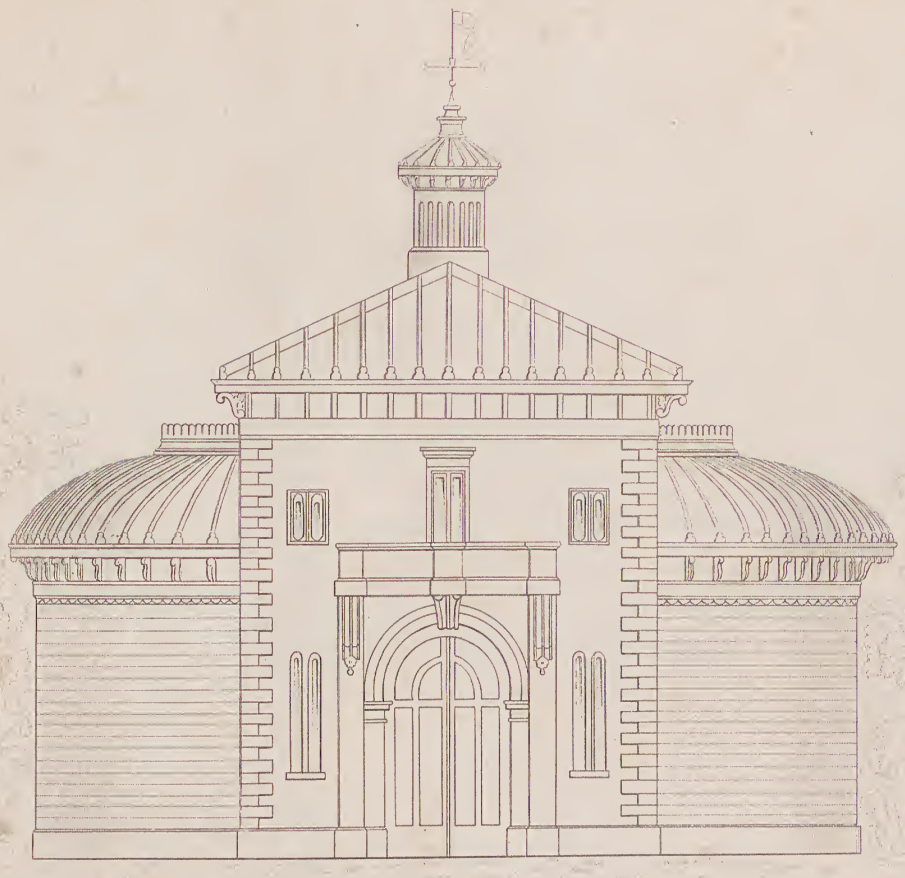


FIG. II.

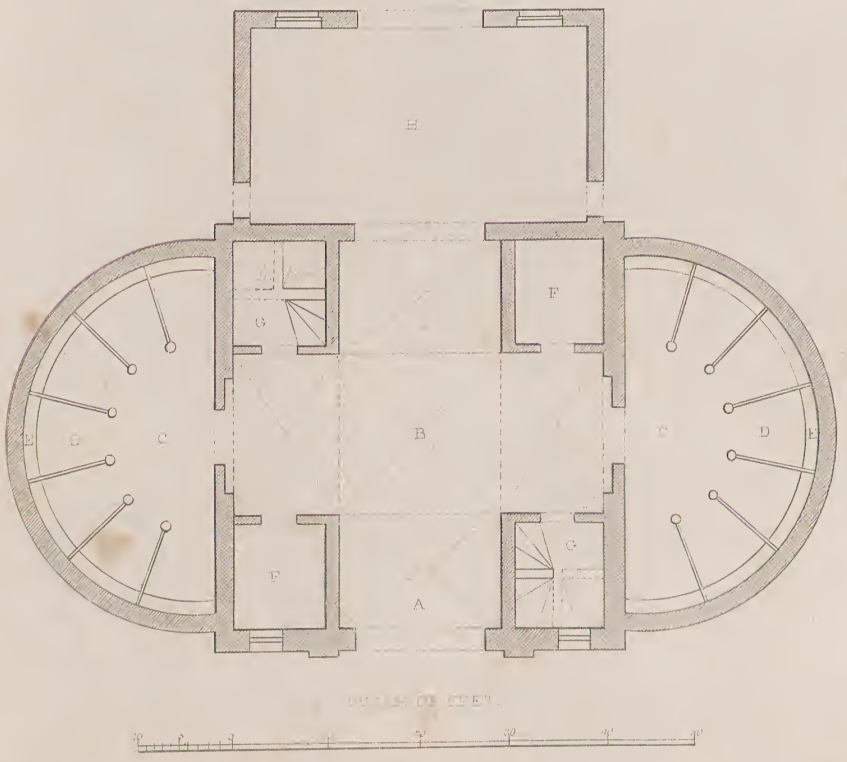
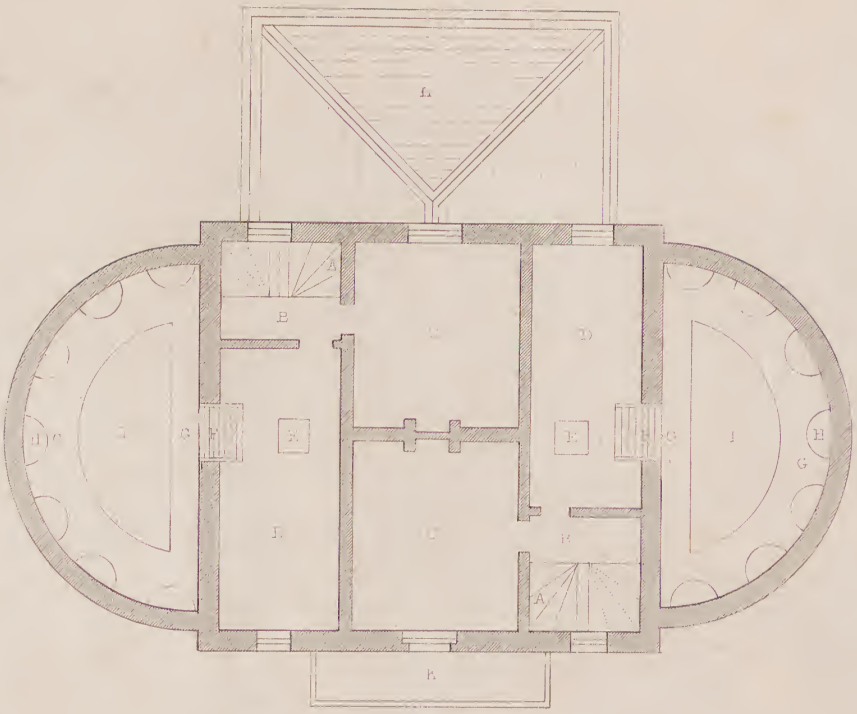


FIG I.



SCALE OF FEET

FIG II.

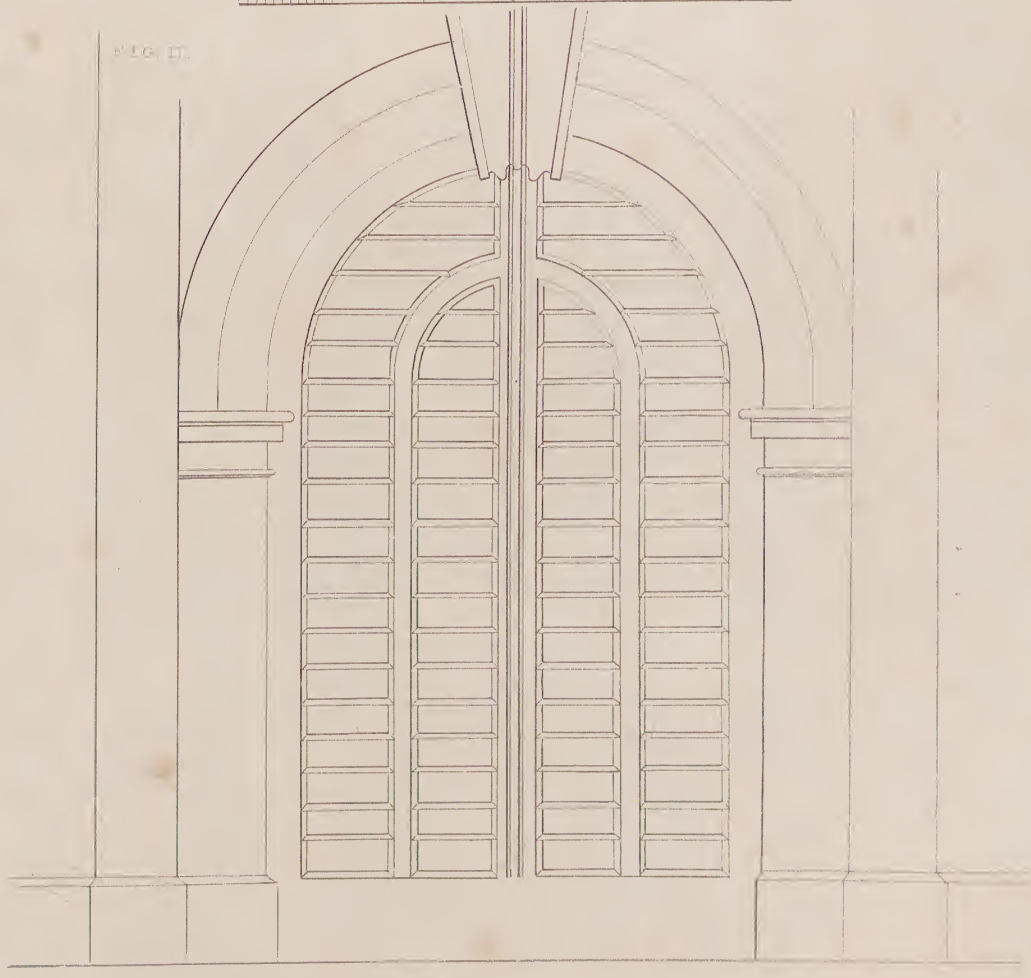


FIG. I.

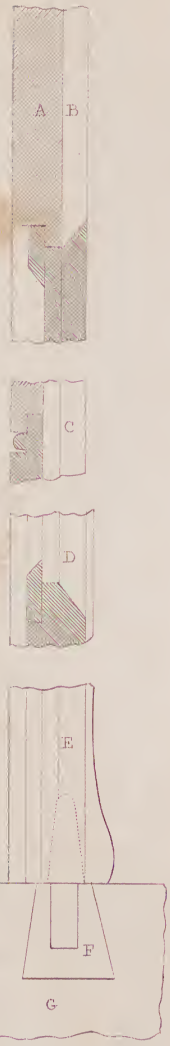


FIG. II.

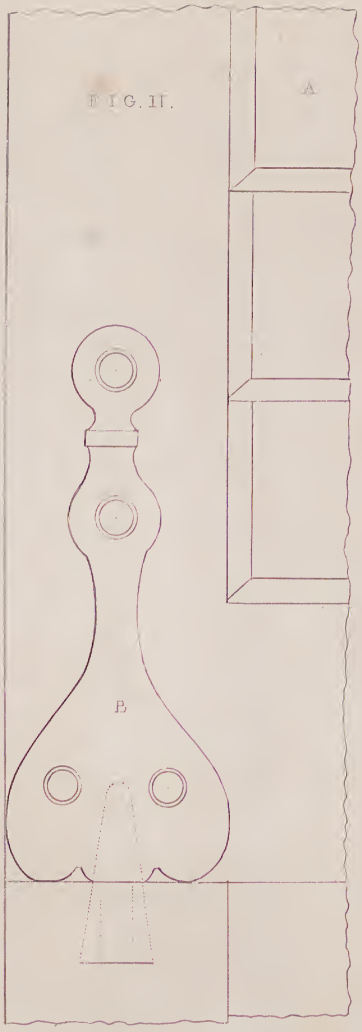


FIG. III.

FIG. IV.

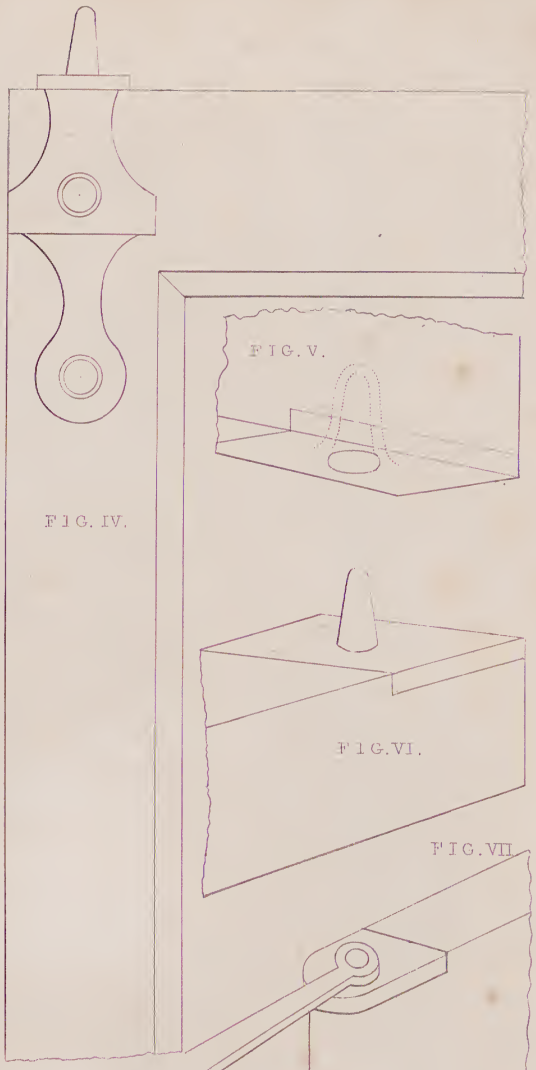


FIG. V.

FIG. VI.

FIG. VII.

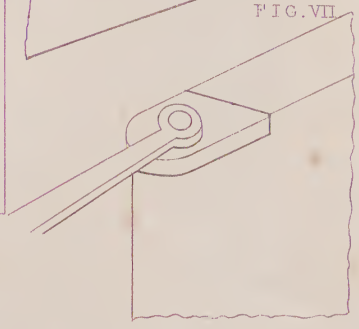


FIG. VIII.

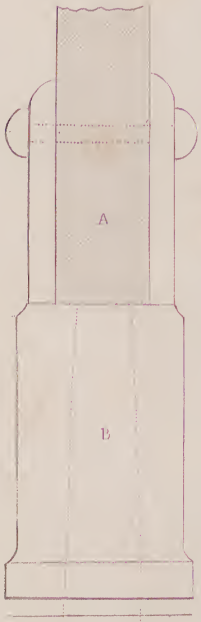


FIG. IX.

FIG. X.

W. H. BROOKS ARCH.

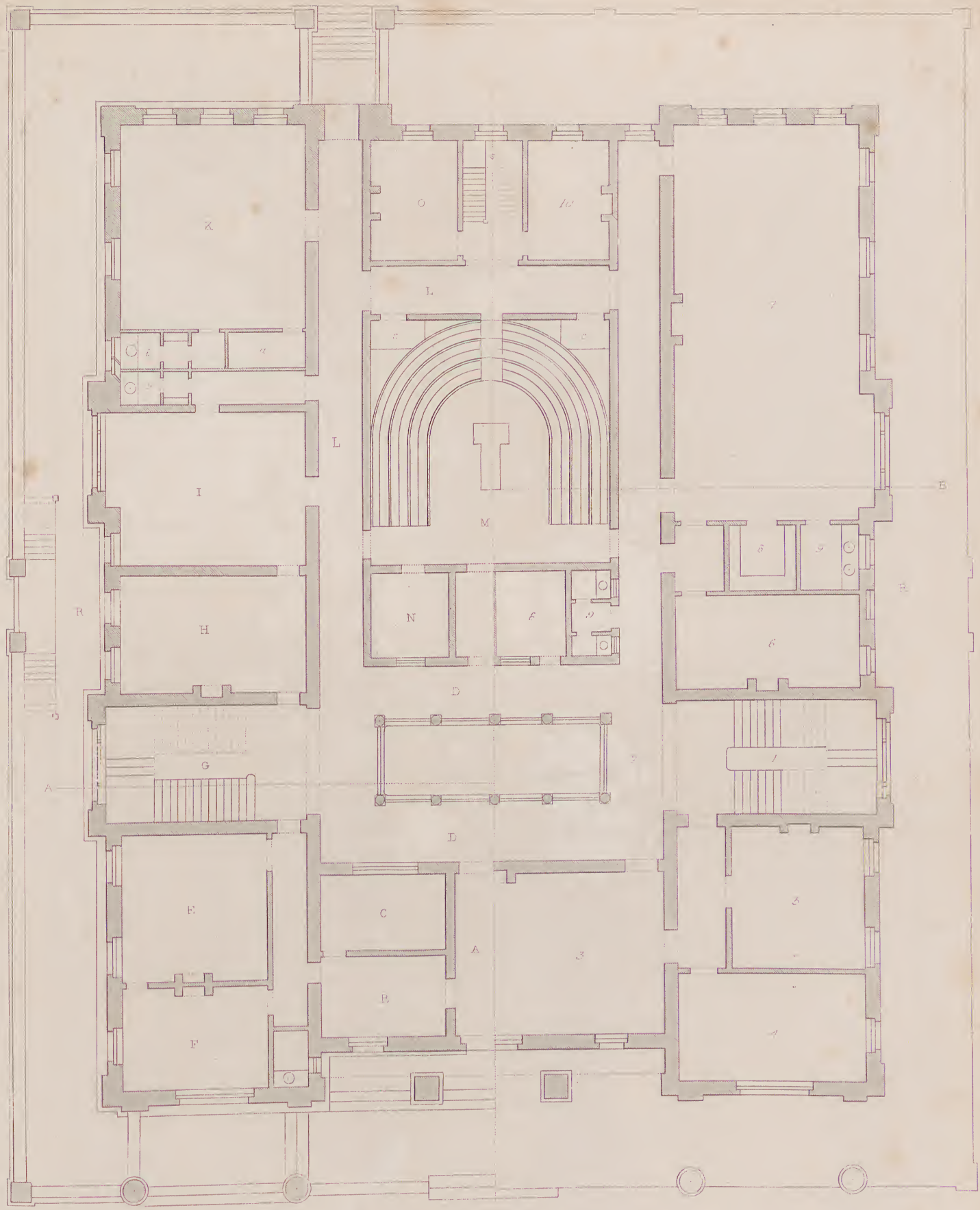
LONDON: THOMAS KELLY 1839.

LONDON: THOMAS KELLY 1842.

FIG. 1 HALF PLAN OF GROUND STORY.

FIG. 2 HALF PLAN OF FIRST FLOOR.

PLATE XXXV



SCALE OF 1 FEET.

LONDON, THOMAS KELLY, 1842.

FIG. 1.

HALF SECTION THROUGH STAIRS AND GALLERY

FIG. 2.

HALF SECTION THROUGH THE [illegible]

SCALE OF FEET.

S. H. BROOKS, ARCH.

LONDON: THOMAS BOSWORTH, 1841.

FIG. IX.

FIG. XI.

FIG. XIV.

FIG. XVI.

FIG. XVII.

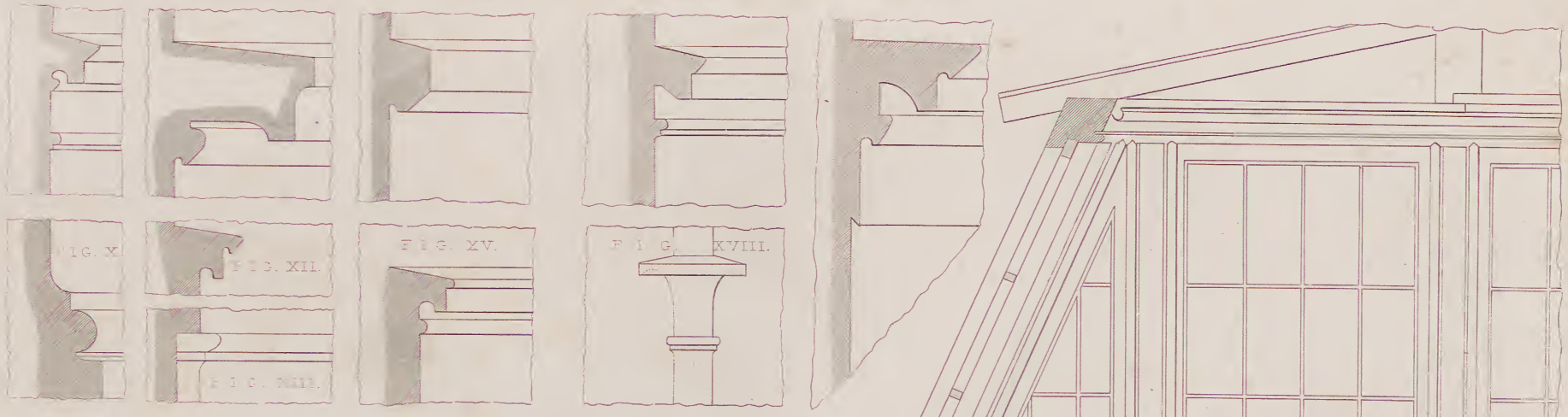


FIG. X.

FIG. XII.

FIG. XIII.

FIG. XV.

FIG. XVIII.

FIG. IV.

FIG. V.

FIG. II.

FIG. VII.

FIG. III.

FIG. VI.

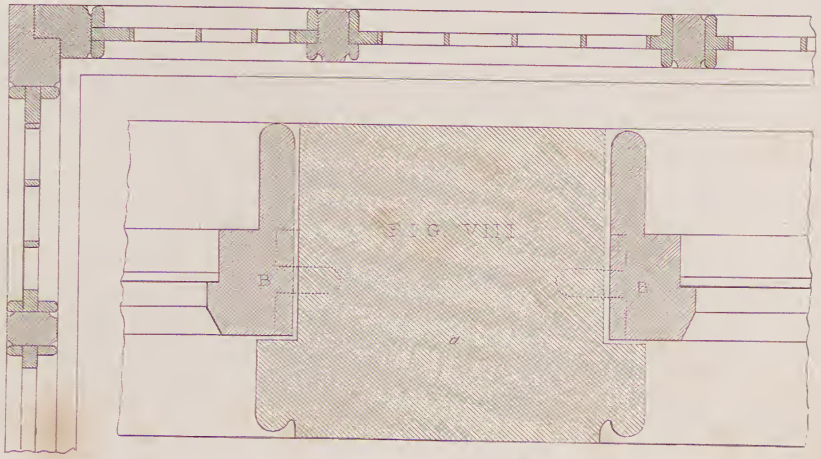


FIG. VIII.

B

B

a

FIG. I.

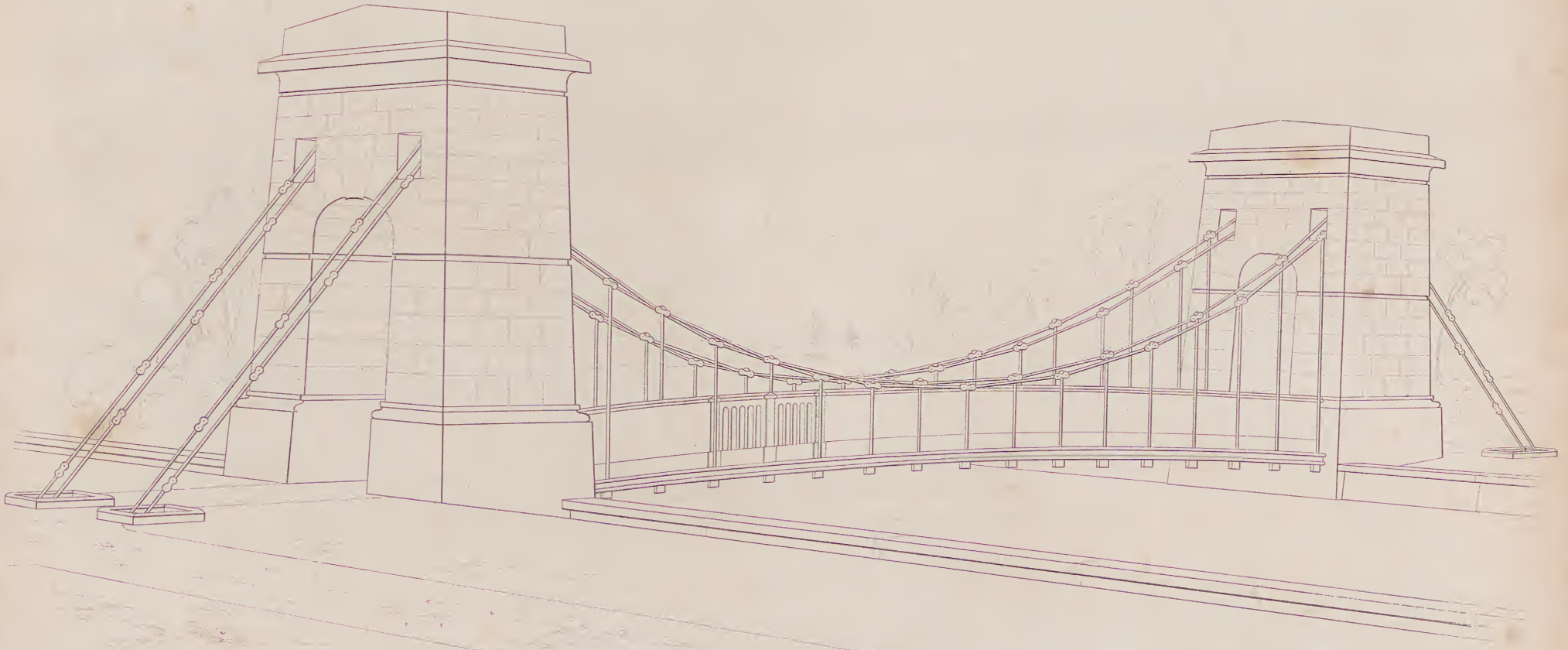
SCALE OF FEET.

THOMAS JUDGE

LONDON: LOUISE DAY & SON

PLATE 1 (2ND)

PERSPECTIVE VIEW



J. C. BROOKS ARCT

LONDON: THOMAS KELLY, 1842

H. ADLARD, SC

FIG I.

FIG II.

FIG III.

FIG IV.

FIG V.

FIG VI.

FIG VII.

GROUND PLAN

GROUND LINE

GROUND LINE

WATER LINE

WATER LINE

SCALE OF FEET

PERSPECTIVE VIEW.

LONDON: THOMAS REILLY, 1843

FIG. I. HALF SECTION OF CONSTRUCTION.

FIG. II. HALF SECTION OF FINISHINGS.

SCALE OF FEET

LONDON THOMAS CLEAVER 1851

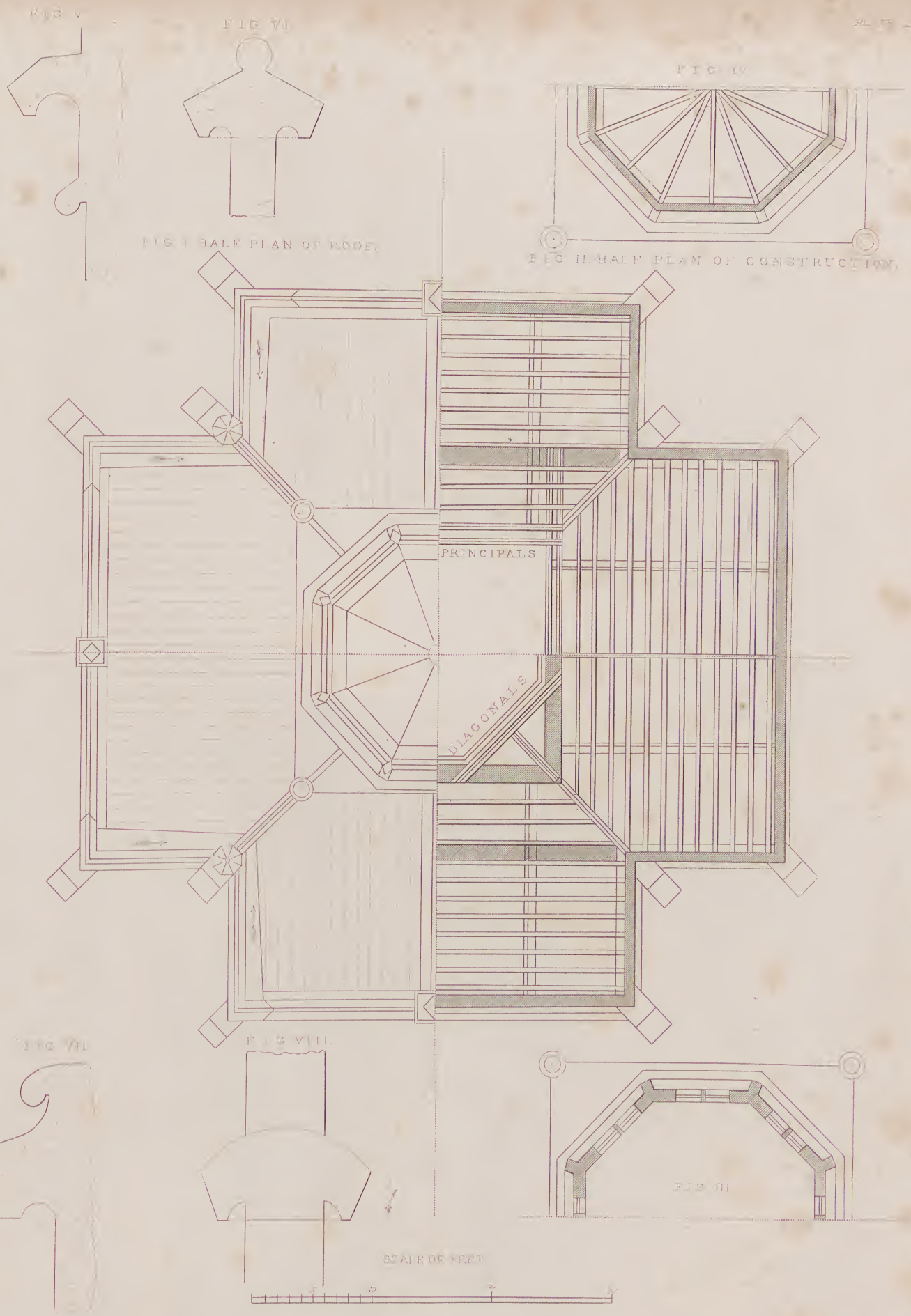
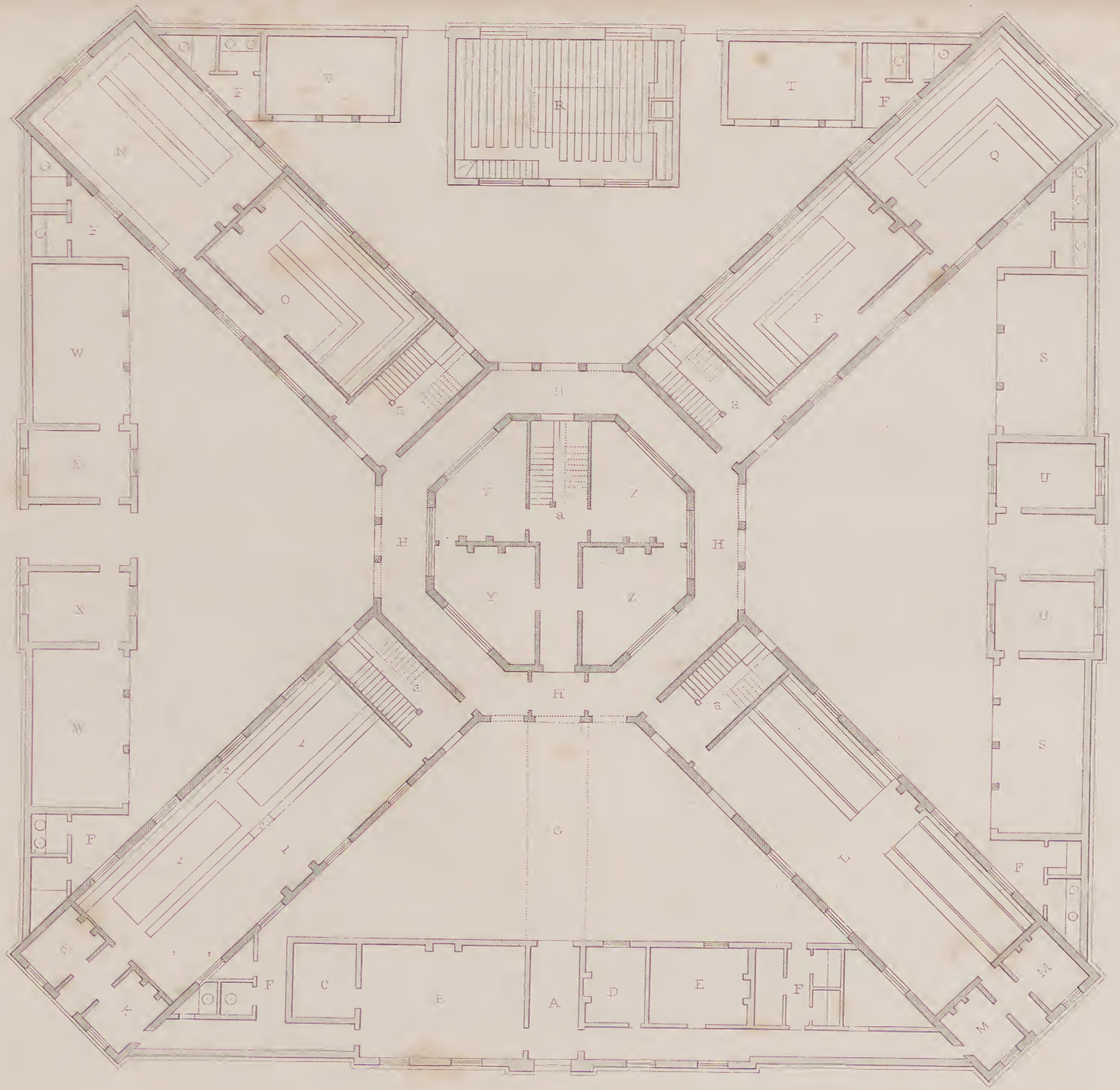
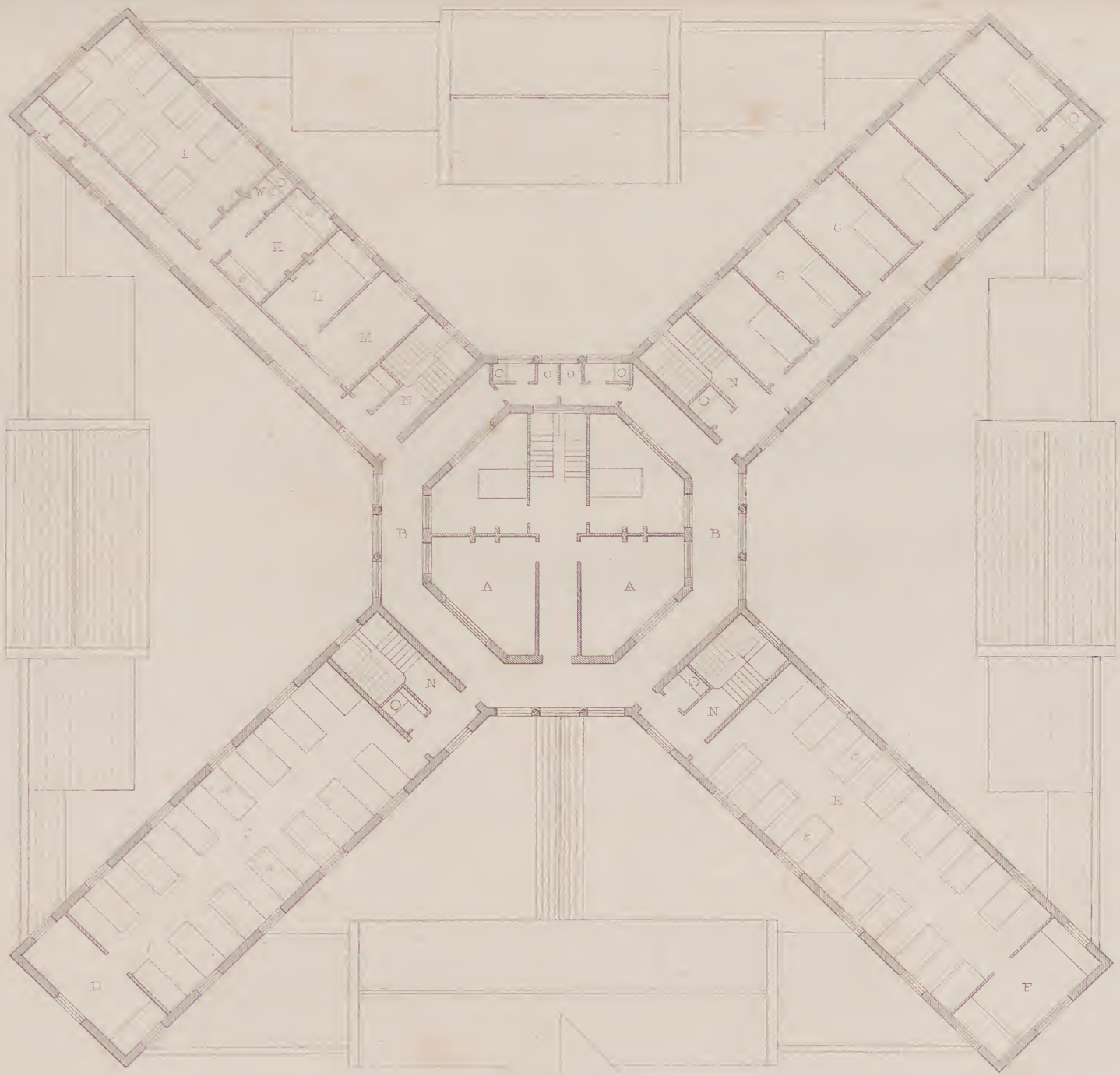


FIG V.
FIG VI.
PLATE XXXI.
FIG IV.
FIG I. HALF PLAN OF ROOF.
FIG II. HALF PLAN OF CONSTRUCTION.
PRINCIPALS
DIAGONALS
FIG VII.
FIG VIII.
FIG III.
SCALE OF FEET
H.L.BROOKS.ARCT.
LONDON: THOMAS KELLY 1842.
H.ADLARD.

BIRDS EYE VIEW



SCALE OF FEET



SCALE OF FEET

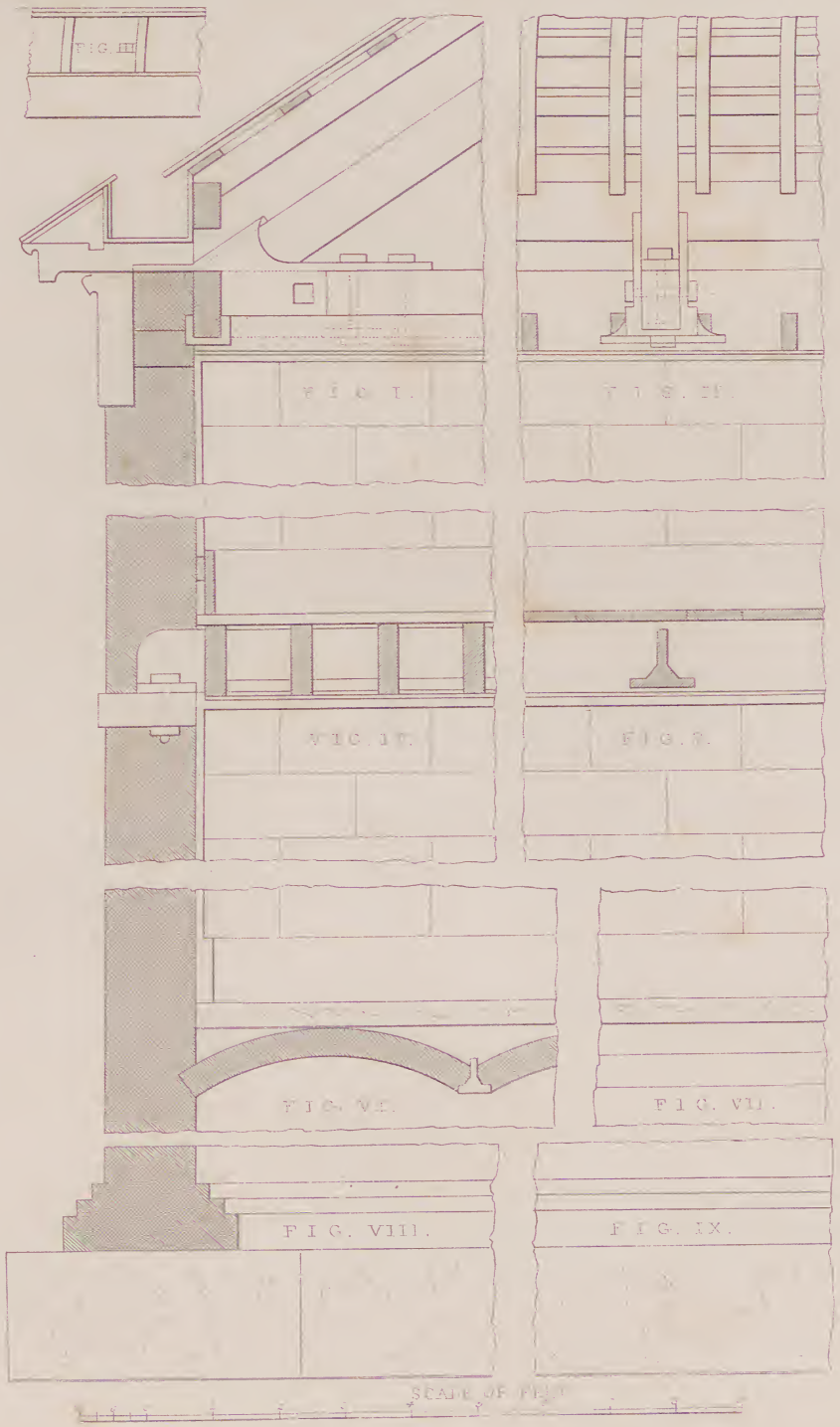


FIG. III.
FIG. I.
FIG. II.
FIG. IV.
FIG. V.
FIG. VI.
FIG. VII.
FIG. VIII.
FIG. IX.
SCALE OF FEET

FIG. XIV.
FIG. XV.
FIG. XII.
FIG. XIII.
FIG. XI.
FIG. X.
SCALE OF FEET

PERSPECTIVE VIEW OF GRANARY.

PLATE LXXXVI

FIG. I.

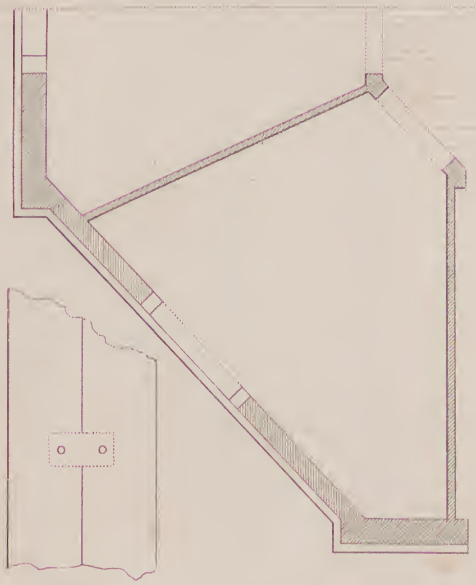


FIG. II.

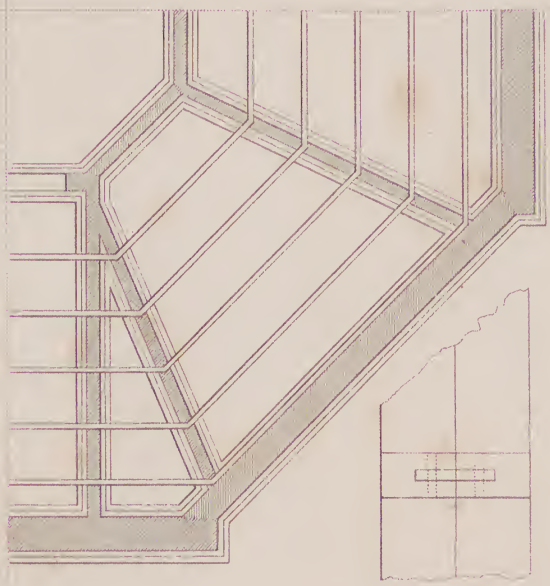


FIG. III.

FIG. IV

SCALE OF FEET

LONDON THOMAS KELLY, 1842

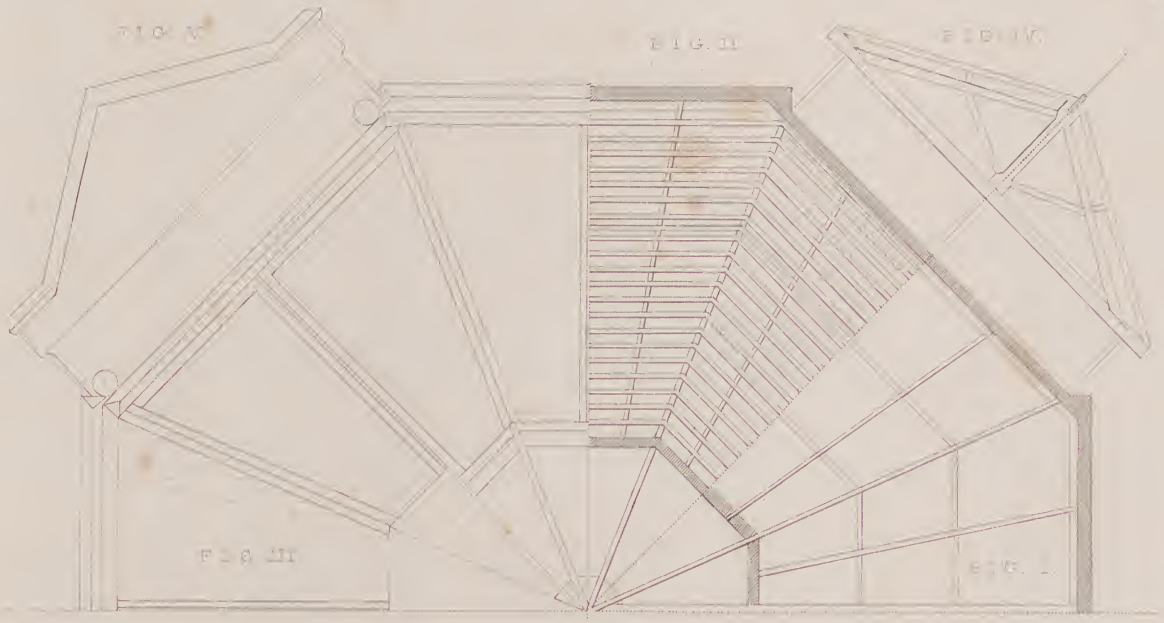


FIG. VII.

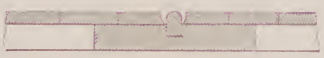
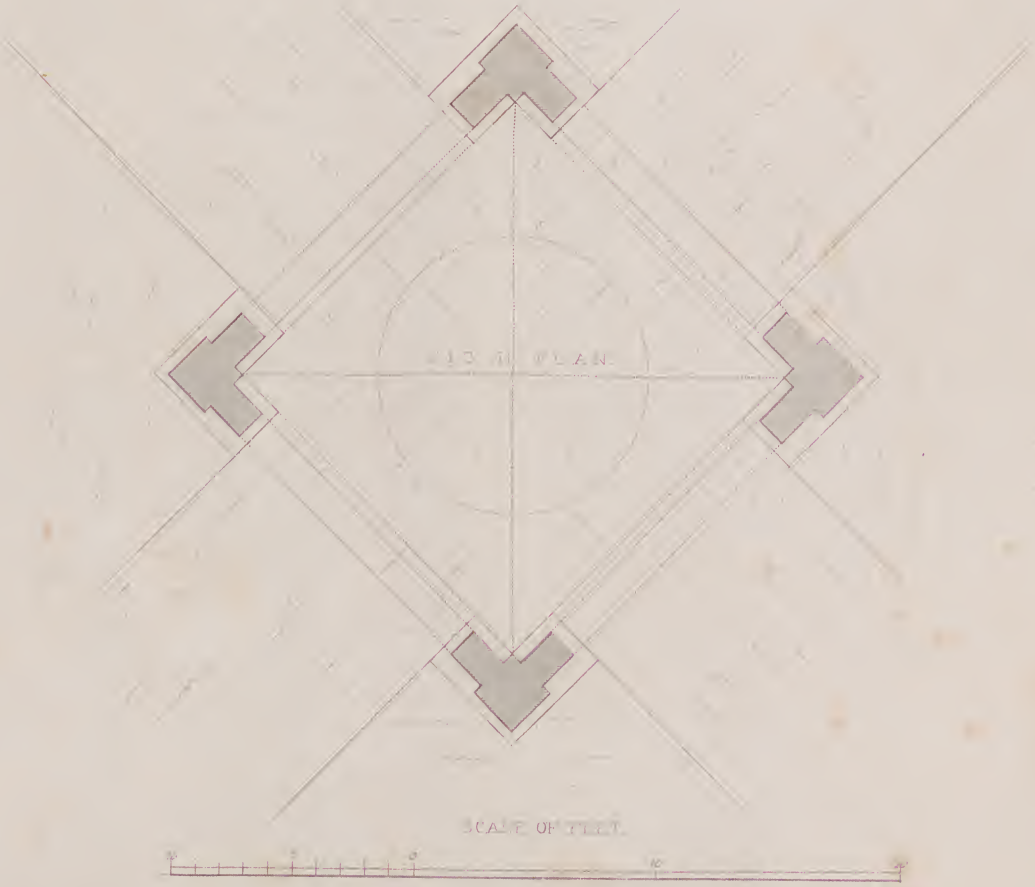


FIG. VIII.

FIG. VI.

SCALE OF FEET.



LONDON: THOMAS KELLY 1842

FIG I

FIG VI

FIG VII

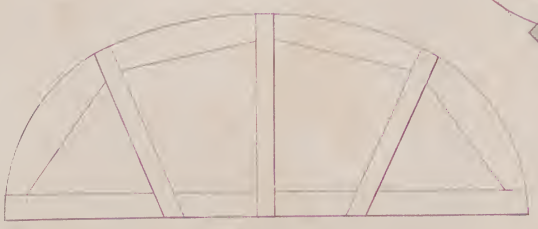


FIG III

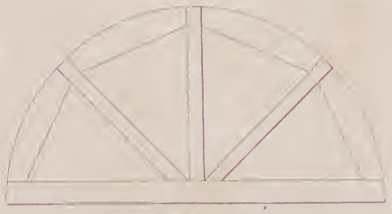


FIG II

FIG IV

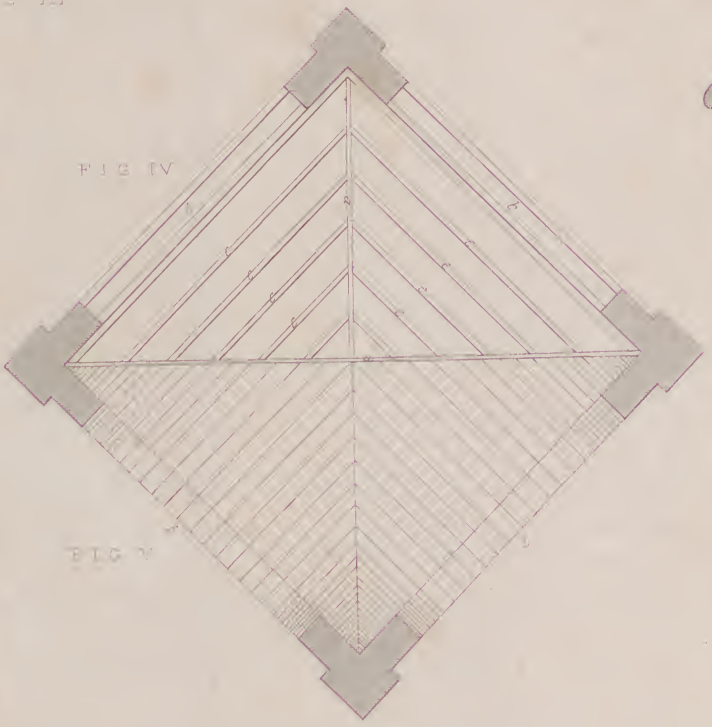


FIG VIII

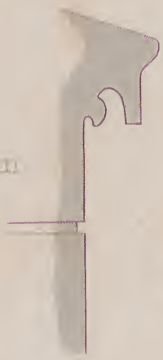


FIG X

FIG V

FIG XI

FIG XI

FIG. I.

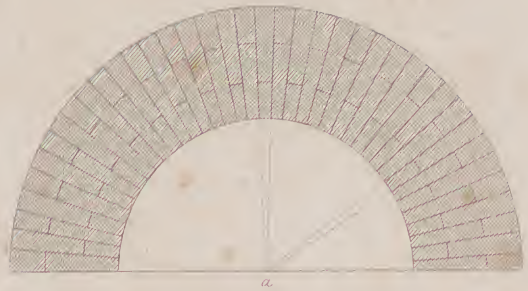


FIG. II.

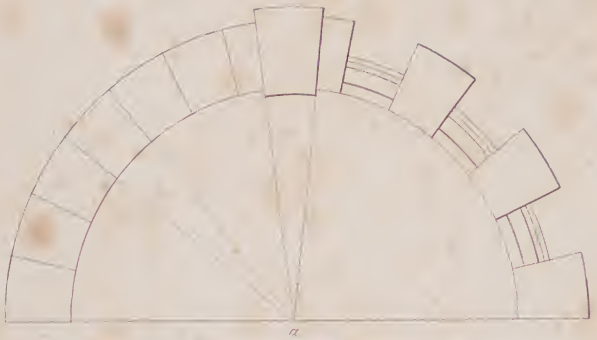


FIG. III.

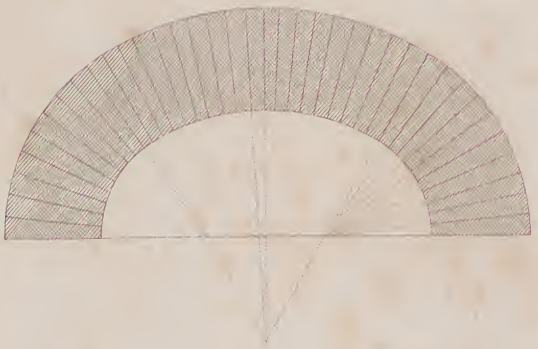


FIG. IV.

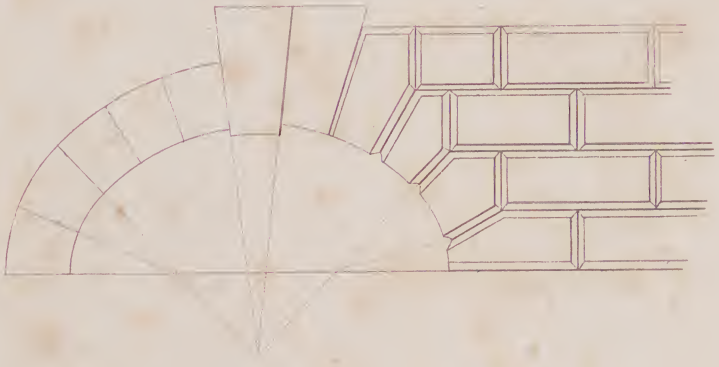


FIG. V.

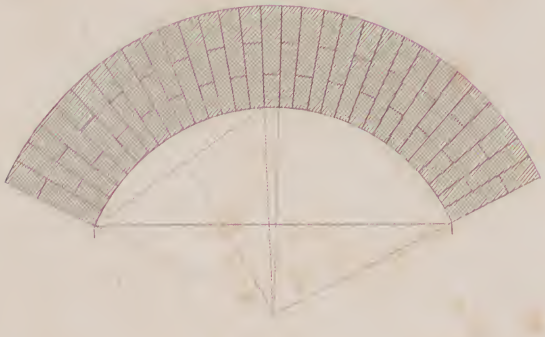
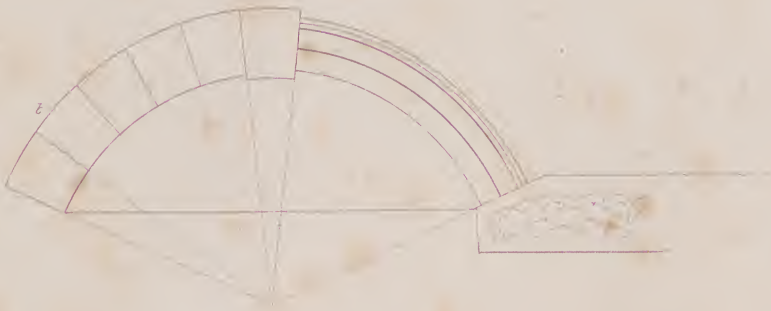


FIG. VI.



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